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What You Have Here

Just when I had finished wedging the last bit of new information into the bulging 1,200-page completely updated *Macworld New Complete Mac Handbook*, the publisher of *Macworld* magazine provided an opportunity to make this free sample of the book. If I thought it was a challenge to condense more than ten years' experience devoted to the Macintosh into a single package of CD-ROM and 1,200-page book, that was nothing compared to selecting the morsels for this 40-page *Macworld New Complete Mac Handbook Sampler*. The selection here includes

- An overview of the second-generation Power Macs (the book includes details on all the new models)
- Upgrading tips
- Advice for faster, more efficient faxing from your Mac
- How to turn a Power Mac or AV Mac into an answering machine and speakerphone
- A sampling of troubleshooting tactics
- Tips on putting aliases to work, speeding up Microsoft Word, and using the PowerBook trackpad

But Wait, There's More

Of course, this 40-page booklet leaves out more than 1,100 pages' worth of the *Macworld New Complete Mac Handbook*'s buying advice, tips, shortcuts, technology backgrounders, previews of the next System software, and award-winning technical illustrations by *Macworld* illustrator Arne Hurty.

This booklet doesn't have room for the book's unique CD-ROM — really a companion disk, not just a collection of shovelware you can find anywhere. The CD includes original interactive QuickTime movies and animations in which I show how to optimize Power Mac performance, install memory, manage fonts and system resources, master System 7.5 shortcuts, and even create iron-on laser-printed T-shirt transfers. The CD also has QuickTime movie interviews with Apple insiders, searchable text excerpts from the book and hundreds of *Macworld* Star Ratings (capsule reviews from the magazine), plus the Best of BMUG — more than 80 MB of shareware and fonts compiled by the legendary Mac user group.

And that's not all: to keep the book and CD up to date, I'll be posting monthly updates on America Online and eWorld.

If this sampler whets you appetite, you can order the book today by calling 1-800-762-2974.

— Jim Heid

About the Author

Jim Heid has been writing about the Mac since the computer's introduction in January 1984. Since the first issue of *Macworld* in 1984, Jim has been a columnist in the magazine, first editing tips sent in by early Mac enthusiasts and later writing the "Getting Started" column that introduced a new Mac subject each month. Currently Jim writes the monthly "Working Smart" column and also authors features on multimedia, desktop publishing, printers and other hardware, and many other subjects.

CHAPTER ONE

The Latest Macs

This summer, Apple unveils its family of second-generation Power Macs — and what a family it is. At the high end, there's the Power Mac 9500, the fastest and most expandable Mac that Apple has ever made. This chapter provides a brief overview.

The Power Macs

All Power Macs — whether low-end, high-end, first-generation, or second-generation — have numerous features in common:

- *Speech recognition* AV Macs support Apple's *PlainTalk* speech-recognition software, which lets you use spoken commands to open programs and documents, choose program options, and perform other tasks.
- *Telephony support* AV Macs contain additional chips that essentially give them built-in telephone modems *and* voice telephones. Simply put, an AV Mac lets you reach out and touch another computer, a fax machine, or a person. All you have to do is attach the appropriate hardware to the Mac's *GeoPort* connector. (By the way, *telephony* is pronounced *te-LE-phony*, not *tele-PHON-y*. A *telePHONy* tells lies over the telephone.)

- *High-quality audio* Power Macs can record and play sound with fidelity approaching that of a compact disc. (Unless you're a recording engineer or a golden-eared audiophile, you may not be able to tell the difference.) A Power Mac is a great audio-production workstation.
- *Two built-in GeoPort connectors* GeoPort connectors are the gateways to telephony. Power Macs contain not one GeoPort (as do the Quadra AV Macs), but two.
- *Support for a performance-boosting cache card* Each Power Mac model has a slot that accepts a *Level 2 cache card*, which improves performance by holding recently used instructions and data. Some Power Macs include a cache card, which you can replace with a larger one if you like.

First-Generation Common Ground

The first-generation Power Macs — the 6100, 7100, and 8100 — also have some common ground.

- *Multiple monitor support* Macs have had multiple-monitor support since the Mac II was introduced in 1987, but in the past you had to add additional video cards. The Power Macs provide multiple-monitor support right out of the box.
- *Optional AV technologies* Each first-generation Power Mac model was also available in AV form. In the Power Mac world, AV technologies refer strictly to video input and video output — the capability to display and record video signals from a video recorder or other source and the capability to display the Mac's image on a television monitor or record it on videotape.

The members of the Power Mac family share other similar hardware traits, including their memory-expansion schemes. You'll find all the gory details in Chapter 29 of the book, and a few tips in Chapter 2 of this sampler.

Second-Generation Power Macs

All of the second-generation Power Macs share a variety of architectural similarities. Some are obvious — the use of PCI slots instead of NuBus slots, for example — while others are more subtle.

- *From NuBus to PCI* With the first-generation Power Macs, Apple often chose compatibility over performance. The first Power Macs' use of NuBus slots was a prime example — faster slots would have yielded faster machines but forced the Mac world to buy new cards.
- The 9500 sheds these constraints by adopting the PCI (Peripheral Component Interconnect) expansion architecture, which is becoming increasingly popular in the PC world, and a de facto standard on Pentium-based PCs. PCI slots provide dramatically faster performance than NuBus slots and make it far easier for hardware developers to create cards that work in PCs as well as Macs.
- *New memory expansion cards* In the first-generation Power Macs, memory expansion was provided through 72-pin single in-line memory modules, or SIMMs. SIMMs transfer 32 bits of data at a time; to accommodate the PowerPC 601's 64-bit memory architecture, upgrading RAM meant installing SIMMs in pairs. The second-generation Power Macs introduce a new memory-expansion board: the 168-pin *dual* in-line memory module, or *DIMM*.

- *Better networking* Each of the second-generation Power Macs has not only an AAUI Ethernet port, but also a 10BaseT connector, eliminating the need for an extra-cost adaptor to connect the Mac to a 10BaseT Ethernet network.
- *Improved input/output* The internal SCSI bus in the 9500 provides much faster data transfer than the SCSI buses in first-generation Power Macs. Other aspects of the machine's input/output subsystems are also faster, thanks to a new direct-memory access (DMA) scheme that minimizes the processor's involvement in data transfers across the SCSI and PCI buses as well as through the serial and Ethernet ports.
- *A new emulator* Called the Dynamic Recompilation Emulator (DRE), this new OS component runs 680X0 programs faster than did the emulator in the earlier Power Macs.
- *Tweaked system software* The second-generation Power Macs include System 7.5.2; this version incorporates numerous tweaks, most of which are to support the new machines' enhanced hardware.
- *A foundation for graphics acceleration* Previously, hardware developers had to devise their own acceleration schemes when designing ultra-fast video cards; for the second-generation Power Macs, Apple defined a structure for graphics acceleration. This should lead to less expensive and more reliable video cards. And in the little-things-that-count department, the Mac's arrow mouse pointer can now be built into and drawn by a video card, a change that eliminates the flickering pointer you see when a QuickTime movie is playing. (In other Macs, the pointer is drawn by the Mac OS.)

- *Power-saving features* Some forthcoming Power Macs will boast energy-saving sleep modes similar to those found on a PowerBook.

Upgrading Tips

Buying into the Mac world is like boarding a moving train. You stand alongside the tracks, waiting until the right model comes along, and then you time your leap and hold on as money flutters from your pockets. Whew — you made it.

But where are you heading? Toward a dead-end spur?

Every Mac owner has faced worries like these at one time or another — should you sell your old Mac and buy a new one?

These aren't easy questions to answer, but here are a few tips from the book's detailed chapter on upgrading.

Comparing PowerPC Upgrade Options

So you've decided you want to upgrade to a PowerPC-based Mac. You have another decision to make: whether to buy a logic board upgrade — assuming one is available for your Mac — or a third-party PowerPC upgrade card. (In the past, this decision was a bit more complicated, as Apple sold its own upgrade card. In June of 1995, however, Apple turned over its PowerPC upgrade card business to DayStar Digital.)

Here's some advice to help you decide.

Comparing PowerPC Upgrade Cards

Unlike logic board upgrades, PowerPC processor upgrade cards let you switch back and forth between PowerPC and 68K operation. If one of your favorite programs isn't available in native-mode form, you can start up under the Mac's 68K processor.

This feature makes an upgrade card a great way to ease your transition into the Power Mac world.

Upgrade cards also have the edge on price. DayStar's PowerCard 601 sells for less than $700. Its 601 chip runs at twice your Mac's original clock rate, for instance, in a Quadra 700, which has a 25 MHz 68040, the upgrade card's 601 chip runs at 50 MHz, while in a Quadra 630, which has a 33 MHz 68040, the card runs at 66 MHz.

DayStar's higher-performance upgrade cards are the PowerPro family. Several PowerPro models are available. If you have a Quadra/Centris 650 or a Quadra 610, 700, 800, 900, or 950, you can choose from 80 MHz or 100 MHz models. These also provide their own SIMM slots that can accept up to 128 MB of 64-bit memory.

Less-expensive PowerPro 601 cards are available for the Centris/Quadra 610 and the Centris/Quadra 650, 800, and 950. These cards run at speeds of between 40 MHz and 66 MHz, depending on the Mac they're installed in. They lack the on-board SIMM slots provided by the costlier PowerPro models, but they do provide 1MB of cache memory.

The Argument for Logic Board Upgrades

Logic board upgrades cost more, but they provide more. Besides being faster, they give you two GeoPort connectors (on a Power Mac, both the modem and printer ports are GeoPort connectors), support for PlainTalk speech recognition, and 16-bit, CD-quality audio.

The bad news is that logic board upgrades are available for only a few Macs; the exact details, which will be announced later this summer, are covered in the book. You might still be able to find logic board upgrades that turn a 68K Mac into a Power Mac

6100, 7100, or 8100. I don't recommend the logic board upgrades, however; the second-generation machines are so superior to their predecessors — and so reasonably priced — that it makes more sense to buy one of them instead of upgrading.

Easing the Transition from NuBus to PCI

To ease the transition from NuBus, Second Wave has introduced PCI versions of its NuBus expansion chassis. The $595 Xpanse PN200 contains two NuBus slots and draws its power from the Mac's SCSI connector — clever. The $995 Xpanse PN400 contains four slots and the $1,895 Xpanse PN800 contains eight. These larger chassis contain their own power supplies and also accept optional SCSI drive bays.

Using your existing SIMMs in new Power Mac upgrades

Newer Technology and SimmSaver Technology, both of Wichita, Kansas, have created DIMM expansion units that allow you to use existing 72-pin SIMMs in a second-generation Power Mac. That's great news for anyone with a healthy investment in SIMMs — at least in theory. At this writing, the second-generation Power Macs are brand new, and it's too early to say whether these devices will be reliable — the high-speed memory subsystems in the second-generation Power Macs could be sensitive to the additional circuitry that a SIMM-to-DIMM adaptor uses.

Upgrade or New Machine?

Buying the right upgrade requires pinpointing your present Mac's weaknesses: Do programs take too long to start or documents too long to open? You may need a faster hard disk. After a program starts, does it run sluggishly? What aspects of its

operation are sluggish? Do calculations take too long? A math coprocessor or an accelerator or logic board upgrade may be in order. Do color graphics ooze onto the screen? You may need a graphics accelerator. If you answer "all of the above," think about getting a new, faster machine.

Last, but far from least, it's important to assess your financial options to determine which will cost less — upgrading an existing Mac or selling it and buying a new one. In the Mac's early days, upgrading an existing machine usually made better financial sense because the only alternative was a considerably more expensive new machine. As Apple continues to lower prices, the decision isn't as easy. Given the cost of hardware upgrades — and the compatibility and reliability risks that sometimes accompany them — a new machine may be the smarter buy, especially now that the second-generation Power Macs are here. And even if a new machine costs slightly more, the extra features it provides may be worth the cost.

There's another plus to buying a new machine: You get a blank slate that's ready to accept all the upgrade options that will be developed for it. That knowledge will be comforting when the next convoy of new trains rolls out of Apple Station.

CHAPTER TWO

The Mac Meets the Telephone

With some inexpensive hardware and software, your Mac can use a phone line to reach out and touch other computers. These days, Macs can reach out and touch more than just computers and fax machines. With the right products, a Mac can dial the customers in your contact database and let you talk to them.

Macs can also be the hub of a voice-mail system (press 1 if you're intrigued, press 2 if you hate voice mail). They can run automated fax-back systems, which let customers phone in to order product brochures, technical updates, horoscopes, you name it. Callers punch in numbers and the documents arrive via fax shortly thereafter. A Mac-based voice-mail and fax-back system can make a small business look bigger. This Sampler *chapter scratches the surface of two aspects of Mac phone connections.*

When the Mac Meets the Fax

Can you imagine business life without fax machines? The folks at Federal Express probably fantasize about it, but the rest of us wouldn't dream of doing away with those warbling wonders and the cheesy thermal paper that most of them use.

Most of the world relies on desktop fax machines to beam documents about, but the fax modem is another alternative. This section provides tips for getting higher-quality faxes, reducing fax transmission times, and taking advantage of the timesaving features that most fax modem software provide.

The best use for a fax modem is sending documents that you've created on the Mac. The superior quality, efficiency of not having to print documents first, and convenience features offered by fax software combine to make fax modems far superior to desktop fax machines.

Tips for better fax quality

The phrase "fax quality" is as much a contradiction in terms as "military intelligence." But you can take some steps to get the best possible results from a fax modem.

Use TrueType fonts or Type 1 PostScript fonts and Adobe Type Manager

These font formats are so popular that you're probably using them already, so I won't belabor this point. Suffice it to say that these outline font technologies result in smooth text at any size — an important plus for printed and faxed documents alike.

Use sturdy fonts

Keep in mind that relatively low faxing resolution distorts type. The subtleties of delicate typefaces such as Caslon and Garamond disappear in a shower of pixel shrapnel. Use sturdy fonts that have been designed to withstand the rigors of low-resolution imaging — Adobe's ITC Stone Informal is a good choice, as is Lucida.

Use the right resolution

Standard fax resolution is 200 horizontal dots per inch x 100 vertical dots per inch. If you're faxing documents formatted for wide orientation (for example, 11 x 8½ inches instead of 8½ x 11), those figures reverse — horizontal resolution is only 100 dpi. For this reason, you get better quality when you fax horizontally oriented documents in fine mode, which provides 200 x 200-dpi resolution (this tip applies to conventional fax machines, too). Keep in mind, though, that doubling horizontal resolution slows faxing times.

Think twice about using EPS art

If you want to include artwork in a fax — for example, an illustration or electronic letterhead with a company logo — don't use encapsulated PostScript (EPS) artwork. Unless installed in a PostScript printer, a fax modem is a QuickDraw-based device — it relies on the Mac's built-in graphics routines for imaging text and graphics. If you fax an EPS image, it's transmitted at a chunky 72 dpi versus a fax's 200 dpi. The solution: Import EPS art into a QuickDraw-oriented drawing program such as MacDraw, and then save the art as a PICT file. Finally, import the PICT image into the document you're faxing.

If you must fax EPS art, here's a workaround that yields better resolution: create the art three to four times larger than its intended size and then import the art into any program that lets you reduce it by the same amount.

Create a scanned version of your signature

If you're faxing correspondence, you may want to create an electronic version of your signature so that your faxed correspondence looks signed. (Source: *Etiquette in the Fax Age*.) If you have a scanner, scan your John Hancock and then save the image

as a TIFF or PICT file. If you don't have a scanner, use a drawing program. First, use the Mouse control panel to select the Tablet speed (you have finer control over the rodent), and then draw your signature at roughly twice its normal size. Save the result as a TIFF or PICT file.

When it's time to "sign" a document, import the image and scale it down to 50 percent. If you're signing documents created with Microsoft Word or another word processor that has a glossary or autotext feature, you can store the signature as a glossary entry and retrieve it with a keystroke or two. Or paste the image into the Mac's Scrapbook, where you can copy it for pasting into any program (or with System 7.5, drag it into a drag-aware application).

Save time — don't go gray

Speaking of slow faxing, avoid using extensive areas of gray shading in a document. When you send a fax, the fax software compresses the page image by replacing groups of identical white or black pixels with a code (this *run-length encoding* is the foundation of most image-compression techniques). Gray shades made up of alternating black and white dots can't be efficiently compressed.

In one test I performed, a page containing several large 50-percent gray shades took over five minutes to transmit. The same page without the gray areas took only a minute and a half. When I replaced the 50-percent gray shades with a lighter, 10-percent gray (which can be compressed to some extent), transmission time improved to just under two minutes — not much slower than the grayless version. The lesson: If you want to use gray shading to dress up a page or highlight a row of spreadsheet figures, use a light pattern such as 10 percent. (Shades darker than 50 percent or so usually end up printing as black, by the way.)

Scan hard copy at 200 dots per inch

If you are scanning some hard copy as a prelude to faxing, set up your scanner software to scan at 200 dpi. If you scan at 300 dpi or more, the fax software slows down as it works to downsample the page image to 200 dpi.

Dealing with incoming faxes

I've already confessed my bias toward desktop fax machines for receiving faxes. If you disagree with my preference — or you don't have a conventional fax — here are some tips for dealing with incoming faxes.

Save your eyes: view at 200 percent

If you've received a small fax that you don't want to print out, use your fax software's viewing feature to zoom the page image to 200 percent. The text is much more readable on-screen.

Print on a QuickDraw printer for faster results

If you want to print a received fax, you see your output more quickly if you print it to a QuickDraw-based printer such as an HP DeskWriter or an Apple LaserWriter Select 300 or Personal LaserWriter 300. A PostScript printer connected via LocalTalk is likely to take longer to print the fax, given LocalTalk's relatively slow speed and the need to convert the page image from QuickDraw to PostScript. A Level 2 PostScript printer combined with Apple's LaserWriter 8 driver (also known as Adobe's PSPrinter driver) provides better performance, as the driver can compress the page image before sending it to the printer.

Converting a fax to text with OCR

Some fax programs offer OCR options that can turn faxed text into editable text. You get the most accurate results with fine-mode faxes containing 12-point or larger text. Simple fonts such

as Courier help, too. Even then, don't expect anything near 100-percent accuracy.

Dealing with fax files

If you receive a lot of faxes, you need a fair amount of disk space to store them. If you're sure that you're finished with a received fax, delete it. Or do an occasional purge of the fax folder, printing faxes you want to keep or copying them to floppies or other backup medium.

Telephony: Making and Taking Calls

So much for talking to fax machines — what about using the Mac to talk to other *people?*

Dialing and calling

One way in which Apple is pushing telephony is by building GeoPort connectors into the AV Macs and Power Macs. GeoPort promises to do for telephony what LocalTalk did for networking: make hardware connections easy and economical.

The AV and Power Macs have enough processing horsepower to generate and decode the squeaks and squawks that are normally the exclusive vocabulary of data or fax modems. All an AV or Power Mac needs is a hardware interface that connects it to telephone lines. That's where Apple's GeoPort Telecom Adaptor comes in — it's a simple interface box that connects the Mac to analog phone lines (the kind you have in your house). If you plug a GeoPort Telecom Adaptor into an AV or Power Mac, you have a high-speed data and fax modem.

Using an AV or Power Mac as a telephone

GeoPort isn't just for data — it's also capable of carrying voice conversations. Unfortunately, for the first year or two of the

GeoPort architecture's life, this aspect of Mac telephony was more of a promise than a reality. The problem was that Apple had delivered the hardware — the GeoPort connectors and GeoPort Telecom Adaptor — but had not delivered the software that would enable programmers to write telephone applications. That has finally changed, thanks to versions 2.0 and later of the GeoPort software.

Cypress Research Corporation has taken advantage of this to create a terrific screen-based telephony program called MegaPhone (see the "Talking into MegaPhone" figure). MegaPhone turns an AV or Power Mac into a speakerphone — you talk into the microphone that came with the Mac and listen through the Mac's speaker (or through headphones connected to its sound-output jack). MegaPhone performs some sophisticated audio processing to eliminate the coffee-can audio quality that conventional speaker phones suffer from.

MegaPhone also lets you set up address books and provides a speed-dialing feature. The program provides automatic links to databases and contact managers such as FileMaker Pro and TouchBase Pro, so you can swap names and phone numbers between MegaPhone and your existing name-and-address files.

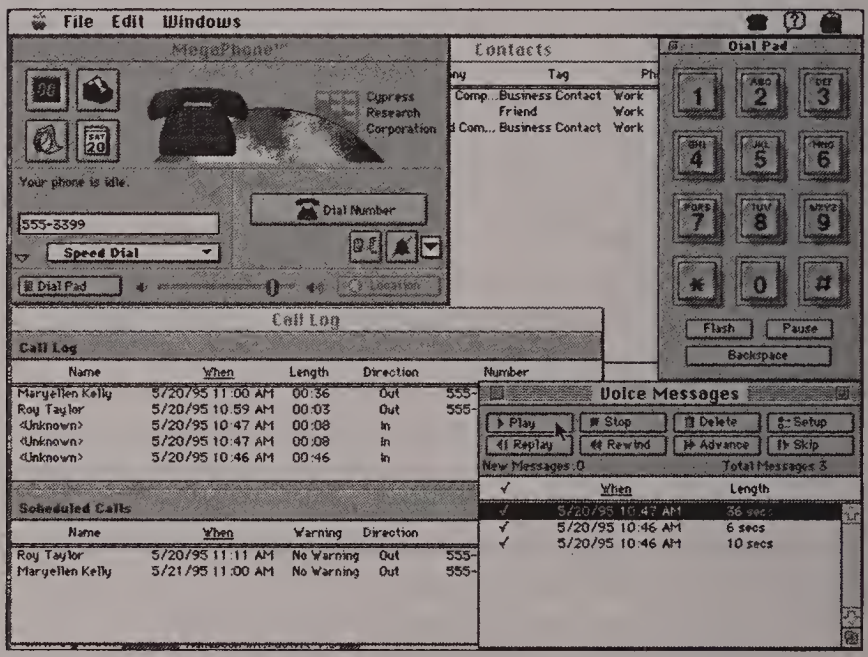
Using MegaPhone to take calls

MegaPhone can also serve as an answering machine — it lets you digitally record an outgoing message and digitizes incoming messages and saves them on your hard disk. The program provides a slick array of message-management features: you can set up a password to check your messages from the road, for example, and you can specify that MegaPhone inform you with a tone when a new message comes in. If you've installed Apple's PowerTalk software, you can even tell MegaPhone to put new messages in your In Tray.

How to get MegaPhone

A 30-day demonstration version of MegaPhone is included with most second-generation Power Macs. If you have an earlier Power Mac or AV machine, you can download the GeoPort 2.0 software and MegaPhone from Apple's customer-support forum on eWorld or from Apple's Internet ftp sites. (A knowledgeable dealer can also provide or let you copy the disks.)

After the trial period, the demo turns into Basic MegaPhone, a simple speakerphone and answering machine that lacks most of MegaPhone's best features. If you become hooked during the trial period, you can upgrade to the full version — over the phone, of course.



Talking into MegaPhone Cypress Research's MegaPhone is a full-feature telephony program that turns the Mac into speaker phone, auto dialer, and answering machine.

Tips for MegaPhone

Making the transition to screen-based telephony? Here are some tips for Cypress Research's MegaPhone.

- *Use the Return key to dial and hang up* You don't have to click the Dial button after typing a number — just press Return. Press Return again to hang up.
- *Use commas for dialing pauses* If you're dialing using a credit card and you need a pause between, say, the phone number and your credit card number, type a comma (,) between those numbers.
- *Set up a MegaPhone hot key* If you use CE Software's QuicKeys utility, set up a hot key that opens MegaPhone when you press a keyboard shortcut.
- *Watch your disk space* MegaPhone uses 17K of disk space for each second of recorded sound, so long incoming messages can fill a hard drive quickly. If you're going away for a while, consider freeing up some disk space first, or specify that MegaPhone store messages on the highest-capacity hard drive you have. (To change the drive, click the Setup button in the Voice Messages window and then click the Change button in the Messages Folder area of the Setup window.)
- *Limit message length* Another way to avoid filling the hard drive is to limit message length. MegaPhone is preset to limit messages to two minutes, but you can change that using the Setup window.
- *How MegaPhone stores messages* MegaPhone records each message as a standard System 7 sound file. This means you can play back a message by simply double-clicking its icon in the Finder. (Check the Setup window to determine where your messages are being stored.) And if you want to save a message to a different disk, just copy its file.

CHAPTER THREE

Troubleshooting

The Mac is reliable but not infallible. And when problems do occur, the Mac's friendly facade can even work against you by hiding technical difficulties behind error messages that provide few clues to the problem. At times like these, the Mac almost seems to say, "Sorry, something is wrong, but I won't bore you with the details."

This chapter contains key excerpts from the book's guide to troubleshooting common hardware and software problems.

When Trouble Hits, Retrace Your Steps

When the Mac suddenly starts acting up, think about what you've done recently. Did you just install a new program, control panel, or system extension, connect a new device, or reorganize your SCSI chain? Retrace your most recent steps: The answer to your problem may be in one of them.

If all you find are footprints, check your SCSI peripheral addresses and termination, system software, and extensions.

How to Do a Mac OS "Clean Install"

One of the best ways to cure serious system problems such as frequent crashes is to reinstall the Mac's system software. You can do so by using the system disks or system software CD-ROM that came with your Mac.

You *could* just run the Installer utility to reinstall the system software over your existing folder, but it's better to do what's called a *clean install* — that is, not to fix up the old System Folder, but to create a shiny new one.

There are two ways to do a clean install:

- Open your existing System Folder and move the System file into any other folder, such as the Extensions folder or the Preferences folder. Then run the Installer. (By "hiding" the System file, you trick the Mac into thinking the disk doesn't have a System Folder.)
- Run the Installer and press ⌘-Shift-K at the main Installer screen. A message appears asking whether you want to update your existing System Folder or to install a new one. Select Install New System Folder.

After you've done a clean install, you will need to restore your favorite fonts, Apple menu items, and the like. That's the bad news. But the good news is that you will have a spanking-fresh Mac OS installation, and that will almost certainly cure your crashes.

Extension Troubleshooting Strategies

When your System Folder is laden with extensions, their interaction may cause crashes. Here I describe some techniques that may help solve the problem.

Step 1: Try starting up without them

If you have trouble starting up the Mac, extension conflict could be the cause. With System 7, you can bypass all extensions by pressing the Shift key while the Mac is starting up. Hold the Shift key down until the message *Extensions off* appears below the *Welcome to Macintosh* message. If the desktop appears, chances

are the problem is with your extensions — proceed to the next step. If the Mac still doesn't start up, the hard drive's System Folder or boot blocks may be damaged.

Step 2: Find the troublemaker

One strategy for troubleshooting extension conflicts is to drag all extensions out of the System Folder and then put them back one-by-one, restarting after each, until the big bomb appears. To save time, you may try dragging only half the extensions out and then adding one or two at a time.

Step 3: Downsize your extension collection

While you're contemplating all the time that troubleshooting wastes, think about your collection of extensions and consider getting rid of ones that aren't absolutely essential to your work. The more extensions you use, the greater the chance that two of them won't get along. Other pluses to downsizing your extension collection: Your Mac will start up faster and will have more free memory for your programs.

Medicine for curing extension woes

The Extension Manager control panel that accompanies System 7.5 is a good tool for solving extension-conflict problems. You can also use it to create and switch between sets of extensions.

But the ultimate weapon for fighting extension problems is Casady & Greene's Conflict Catcher III. Besides letting you manage (disable and enable) extensions and letting you know how much memory each uses, Conflict Catcher III can help you track down extension conflicts. Conflict Catcher III can also ferret out extensions that may be slowing down a Power Mac by patching over native-mode system software routines.

Troubleshooting PowerBooks

PowerBooks have their own kind of trouble, but this advice will help solve the most common problems.

The speaker pops occasionally

As the old computer industry joke says, "this isn't a bug — it's a feature." Ten to twenty seconds after producing a sound (such as an error beep), the PowerBook cuts power to its sound chip in order to save battery power. When the power goes, pop goes the speaker. To eliminate the pop, insert a miniplug (Radio Shack catalog number 274-368) in the PowerBook's speaker jack. You won't hear a peep (or a pop).

When the PowerBook is connected to a network, it never goes to sleep.

If the PowerBook has the recharger cord plugged in, open the Chooser and check to see if AppleTalk is on. If it is, you've found the reason: Apple designed the PowerBook's EverWatch power-management features with the assumption that if the recharger is plugged in and AppleTalk is on, you're at your office and you want the PowerBook to be as fast and responsive as possible. (Note that the PowerBook detects only whether the recharger cord is plugged in, not whether there's current flowing through the recharger.)

The other possibility for the PowerBook not going to sleep is that AppleTalk is on and you're connected to a shared hard disk or network electronic mail service. In this case, the PowerBook is detecting periodic network activity and thus stays awake. (Simply having AppleTalk active and being plugged into a LocalTalk network does not keep the PowerBook awake when the power cable is not connected.)

A program slows dramatically while performing a time-consuming task. Moving the trackball wakes up the system, and processing continues.

The power consumption of the PowerBook's microprocessor is reduced automatically when it detects that no activity requiring its attention has taken place for a period of time. This is called *processor cycling*. The processor comes back up to speed instantaneously when you resume using the computer. The problem is, some programs don't work properly with processor cycling on. Try turning off processor cycling while using the program. Use the PowerBook control panel to turn off processor cycling.

The PowerBook doesn't run on the battery but operates normally when plugged into AC power.

PowerBook 100: Check that the storage switch on the back of the computer (next to the power connector) is in the up position. This switch disables battery power but enables you to use the unit with AC power. Another possibility: A fuse on the logic board can blow if the computer's lithium batteries aren't removed before the unit is taken apart. It's also important that the unit be completely reassembled before the batteries are reinstalled. Have the fuse replaced by a technician. And think at least twice before venturing into the PowerBook's tight confines.

Other PowerBook models: A fuse on the logic board may have blown. The black insulating "O" ring on the tip of the AC adaptor may be damaged and shorting out against the logic board. Have the adaptor repaired and the fuse replaced by a technician.

Your 500-series PowerBook is not recognizing or charging a battery.

The 500-series PowerBooks use so-called Intelligent Batteries that can become dumb and refuse to charge. Batteries that ex-

hibit this problem typically have an extremely low charge — because, perhaps, you waited too long to charge the battery, or you stashed it in a drawer for three months. Since the power-management features of the 500-series batteries depend on having a certain amount of juice available, the PowerBook can have trouble recognizing the battery and charging it.

Look for these symptoms of a dumbed-down battery: the battery gets extremely hot during charging; the battery doesn't show up in the Control Strip's battery monitor module (a grayed-out battery appears instead); the battery becomes completely discharged after only a day or two of sleep. If you find one or more of these symptoms, you can fix the battery using an Apple utility called Intelligent Battery Recondition; it's available on-line or from Apple dealers. VST Systems' EMMPathy is a freeware utility that also restores the smarts to a dumb battery. It's included on this book's CD.

Power Mac Problems

Your computer seems to be running slowly, even when you're using native applications.

You may be using one or more system extensions that patch native-mode system software with 68000-family code. Run Casady & Greene's Conflict Catcher III and see "Extension Troubleshooting Strategies" earlier in this chapter for details on this problem.

You just installed the Power Macintosh Upgrade Card, but you can't get the Mac to restart in Power Macintosh mode.

After using the upgrade card's control panel to specify that the Mac start up in Power Mac mode, you must shut down the computer and then turn it back on. Simply restarting isn't

enough because the computer's chips don't get reset unless they are powered off. (A hard reset — the Control-⌘-power key keyboard sequence — will shut power off but can corrupt the System file.)

Did you recently reset the parameter RAM? If so, the computer will boot up in 68K mode. Use the upgrade card's control panel to specify that the Mac start up with the upgrade card.

You've installed some video RAM upgrade SIMMs in a Power Mac 7100 or 8100, and now you're having weird video problems.

You may have installed the wrong kind of SIMMs. The VRAM expansion card SIMMs for the 7100 and 8100 have the same pin configuration and size, but they're electrically different and they aren't interchangeable. How can you tell them apart? The SIMMs for the Power Macintosh 7100 have two chips per SIMM, while SIMMs for the Power Macintosh 8100 have four chips per SIMM.

When you insert an audio CD, a message appears saying that the disk isn't readable and asking if you want to initialize it.

Make sure you have the Foreign File Access and Audio CD Access files in your Extensions folder. The Mac needs these files to recognize audio CDs.

Do you have both PC Exchange and Dayna Communications' DOS Mounter installed? If so, remove one of them from your System Folder — when both utilities are installed, the Mac can have problems with audio CDs.

CHAPTER FOUR

Tips, Tips, and More Tips

In more than 1,100 pages, the Macworld New Complete Mac Handbook squeezes in hundreds of tips to help you work faster and smarter on your Mac. This small sampler selection will speed you on your way.

Alias Ideas

There are almost as many ways to use aliases as there are ways to use the Mac. (You make an alias of an item in the Finder by selecting the item and choosing Make Alias from the Finder's File menu.) Here's a collection of ideas to get you started.

Put items in your Apple menu

Don't move an original program, document, or folder to the Apple Menu Items folder. Create an alias of it and put the alias in the Apple Menu Items folder. Remember that you can rename the alias if you like.

By the way, if you use aliases in your Startup Items folder, you should know that they open after any "real" programs located in the Startup Items folder.

Access a frequently used folder

Perhaps you always use a certain folder that you keep buried within other folders. For fast access to that folder, make an alias of it and move the alias to your desktop. You can then open or modify the contents of the folder by opening its alias — not by opening folder after folder to get to the one you want. You can even copy items to the folder by dragging them to its alias.

Access a file-server volume

An alias provides an easy way to mount an AppleShare file-server volume or a disk or folder made available through System 7's file-sharing features.

First, mount the volume as you normally would, and then select it and choose Make Alias. Rename or move the alias as desired. Thereafter, to connect to the server, simply open its alias, and you receive the standard AppleShare log-on dialog box. (You don't even see the log-on dialog box if you access the server as a guest when making the alias.) You can even use this technique to copy a file to a server volume that you haven't yet mounted: Just drag the file to the alias icon and respond to the log-on dialog box as necessary. The Finder connects to the server and then copies the file.

Access your hard disk from any Mac on your network

First, use the Finder's Sharing command to make your hard disk available. Next, make an alias of your hard disk, and then copy that alias to a floppy disk. To connect to your hard disk from a different Mac in your network, simply insert the floppy disk and double-click the alias.

Access an extension or control panel from somewhere else

Normally, system extensions reside in the Extensions folder, which is in the System Folder. If you want to access an extension from the Control Panels window, make an alias of the extension and move the alias to the Control Panels folder (also within the System Folder). Similarly, if you want to access a certain Control Panel directly from the Apple menu, make an alias of it and move the alias to the Apple Menu Items folder.

Start programs and open documents

If you make an alias of a program, you can start the program and open a document by dragging the document icon to the alias icon. When you do, you see the alias icon become highlighted — just as a folder or disk icon is highlighted when you copy an item to it. Release the mouse button, and the Mac starts the program and opens the document. If the application icon doesn't highlight when you drag the document icon to it, the application may not be able to open that type of document.

Quickly access all the programs on your hard disk

First, create a folder to hold the aliases. Next, use the Finder's Find command to search for all applications at once. After the Mac has found and selected all the applications, choose Make Alias. The Mac makes an alias of every application it finds. You can then move those aliases into a single folder to have quick access to every program on your hard disk.

Automate access to archived files

Many people use file-compression utilities such as StuffIt to compress and archive older files that they copy to floppy disks

and then delete from their hard disks to free up space. If you're in this group, you can use aliases to easily locate your archives — no more rooting through floppies trying to locate the disk that contains a certain archive.

First, make your archive file as you normally do and then copy it to a floppy disk. Next, make an alias of the archive on the floppy and then copy the alias from the floppy to your hard disk — perhaps to a folder called Archive Aliases. Finally, delete the archive from your hard disk. When you need to access the archive, just double-click its alias. The Mac then asks you to insert the appropriate floppy.

Hot Tips for Using Microsoft Word

Know when to disable fast saves

Word's fast save feature is true to its name — when the feature is active, Word's Save command operates in a flash. That's good because it encourages you to save more often. But there are times when it's better to disable fast saves. Here's why: When the fast save feature is active, Word tacks on changes to the end of the document file, which causes file sizes to grow and wastes disk space. (If you're transferring files over networks or phone lines, it also increases transfer times.) By disabling fast saves, you can keep file sizes as small as possible. Another important time to disable fast saves is when you plan to import your files into a publishing program such as PageMaker or QuarkXPress — these and other publishing programs often have trouble reading files saved in fast-save format. To disable fast saves, choose Options from the Tools menu, click the Save tab, and uncheck the Allow Fast Saves box.

Know your double-click shortcuts

You can make a lot happen in Word by double-clicking — if you know where to double-click. You can split a document window by double-clicking the split bar — the heavy black bar just above the document window's vertical scroll bar. (You can also use this shortcut to close annotation and footnote windows.) You can display the Document Layout dialog box by double-clicking the ruler, the Columns dialog box by double-clicking the ruler's column separator, and the Go To dialog box by clicking the page number area of the status bar. You can turn an anchored toolbar into a floating toolbar (and vice versa) by double-clicking it. You can enlarge a window to fill the screen by double-clicking its title bar. When in Page Layout view, you can edit a header or footer by double-clicking it. And in dialog boxes, you can choose an option *and* okay the dialog box by double-clicking the desired option.

Use shortcut menus

Shortcut menus appear when you press the Control key (not the ⌘ key) while pressing the mouse button. Word is smart about which shortcut menus it displays: if the mouse pointer is in the document window when you Control-click, you get menus for formatting, cutting, copying, and pasting. If the pointer is in a toolbar when you Control-click, you get a menu of available toolbars. If the pointer is in a table, a menu of table-editing commands appears. Shortcut menus save time especially when you have a large-screen monitor — they can save you from making the long journey up to the menu bar.

Create AutoText entries

This gives you instant access to often used text or graphics.

Create templates

Template documents that store often-used formatting, macros, AutoText entries, and custom menu, toolbar, and keyboard settings. Word 6 templates are incredibly powerful: they store not only boilerplate text and formatting, but also AutoText entries, customized menu, toolbar, and keyboard settings, and macros. You essentially can change Word's user interface by opening a specific template. Take advantage of this power by creating templates that streamline the types of documents you create.

Set bookmarks in lengthy documents

Word lets you create electronic bookmarks that make it easy to navigate large documents. To insert a bookmark, choose Bookmark from the Edit menu, type a name for the bookmark (the name can't include any spaces), and then click Add. To jump to a bookmark, choose Go To from the Edit menu, select Bookmarks, and then choose the bookmark from the pop-up menu.

Keep often-used dialog box windows open

You can leave many of Word's dialog box windows — Find and Replace, Go To, Spelling, Mark Index Entry — open as you edit text; you don't have to close them to return to the document window. Leaving these windows open can save a lot of time when you're in the editing phase of a project. If you have a second monitor, you may want to stash these windows there so they don't get in the way of your text.

Use the Go Back key sequence for fast edit navigation

Word remembers the last three locations where you edited or typed text. The Go Back key sequence — Shift-F5 — returns

the blinking insertion point to each of these locations. I used Word's Customize command to reassign the key sequence to the numeral 0 on the numeric keypad, a more convenient location.

And of course, you should master Word's keyboard shortcuts. You'll find a list of the most useful ones in the book. Use them when you're in the writing phase of a project and don't want to take your hands from the keyboard.

How to Speed Up Word 6

Word 6 packs far more power than its predecessor, but it's often dramatically slower.

Here are five ways to boost Word 6's performance.

- *Hide all toolbars, the status bar, and the ruler* This dramatically decreases the time required to start Word.
- *Don't let a floating toolbar overlap the document window* This slows scrolling significantly.
- *When in page-view mode, hide the rulers when you aren't using them* This speeds up scrolling.
- *Give Word more memory* If you have 8MB or more of memory, use the Finder's Get Info command to boost Word's allocation to at least 3000K.
- *Fine-tune Word's advanced settings* You can make a big difference in Word 6's performance by tweaking the way it uses memory. For example, if your documents rarely contain graphics, you can tell Word to allocate less memory to graphics and more to the program's code itself. You do so by modifying an advanced Word setting called BitMapMemory.

Here's how. First, you need to add the Advanced Settings command to Word's Tools menu: choose Customize from the Tools menu, click the Menu tab, and under Categories, select Tools. In the Commands list box, select ToolsAdvancedSettings, and then click the Add button. Finally, click the Close button.

To modify the BitMapMemory value, choose Advanced Settings from the Tools menu. In the Categories box, choose Microsoft Word. In the Option box, type **BitMapMemory**, and then move to the Setting box and type **512**. Click Set and then OK.

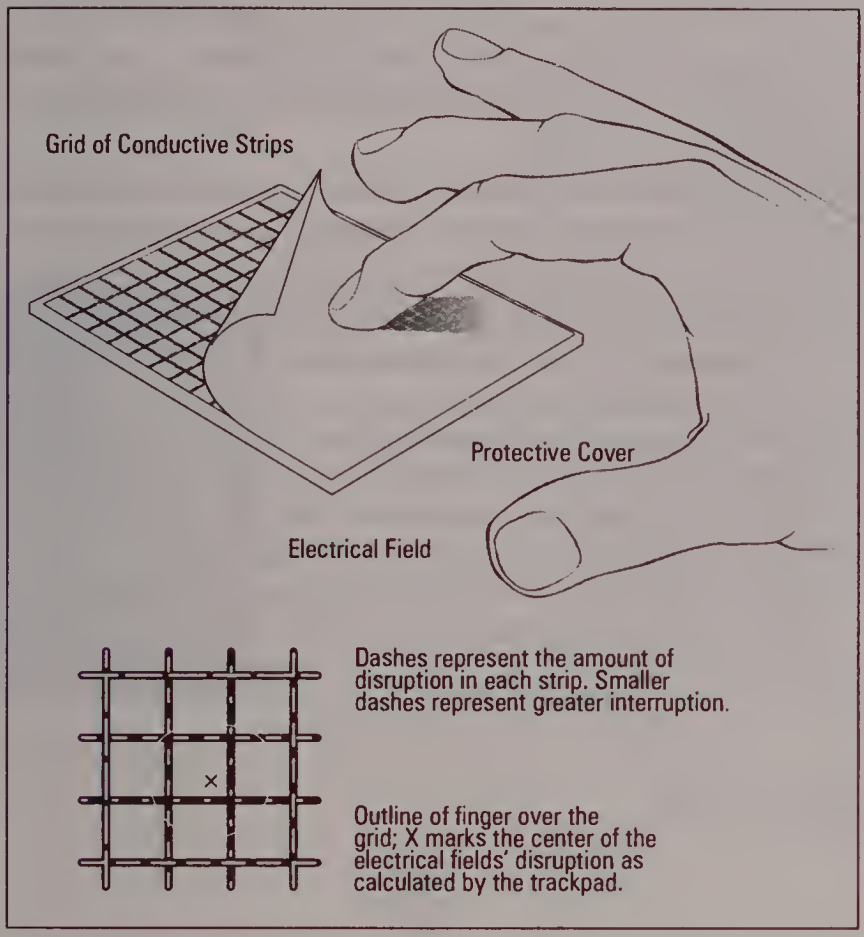
Now quit and restart Word. If Word doesn't run faster — or worse, if it runs slower — remove the BitMapMemory setting. To remove it, choose Advanced Settings from the Tools menu, and choose Microsoft Word in the Categories box. In the Options box, click the BitMapMemory setting and then click Delete.

For more details on advanced Word 6 modifications you can make, you'll need a copy of a Microsoft technical note called *Mac Word 6.0 FastTip: Setup & Performance Optimization*. You'll find it in the Macworld Online forums on America Online and eWorld.

PowerBook Tips

Here are a few tips for the trackpad.

In Apple's 500-series PowerBooks, a small, flat, rectangular trackpad replaces the trackball used in 100-series PowerBooks. The trackpad uses capacitance sensing, just like the touch-sensitive buttons in a modern elevator. Instead of the elevator button's single sensor, the trackpad has a grid of conductive strips. Controlling circuits put out high-frequency signals along the strips and sense changes in the electrical field for each strip.



How the Trackpad Works

This electrical field emanates through and above the surface of the pad.

Placing your finger on the trackpad surface disrupts the electrical field for several of the conductive strips. Sophisticated software and hardware calculate the center of this disturbance. By scanning the strips rapidly, the trackpad's circuitry follows the movement and speed of your finger.

You can't use a stylus, a pen, or even a long fingernail to work the trackpad, you have to use your finger. These devices, unlike your body, do not conduct electricity, and the trackpad relies on that in order to operate.

The trackpad is very sensitive, able to measure 387 dots per inch in the horizontal and vertical directions. For extra-precise positioning, just rock your finger on the pad — you'll be able to move the mouse pointer in single-pixel increments.

Like the mouse, the trackpad uses acceleration curves: The faster your finger moves across the pad, the faster and further the pointer moves across the display. If your finger darts across the pad, the pointer will traverse the display completely. If the finger moves slowly, the pointer does, too. If you find the pointer moves too quickly, use the Trackpad control panel to specify a slower setting. In Apple's user testing, most people preferred the fourth setting up from the slowest setting.

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by Dave Taylor



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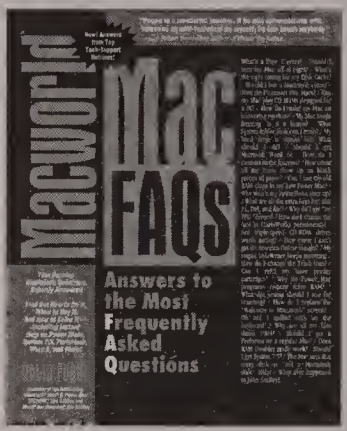
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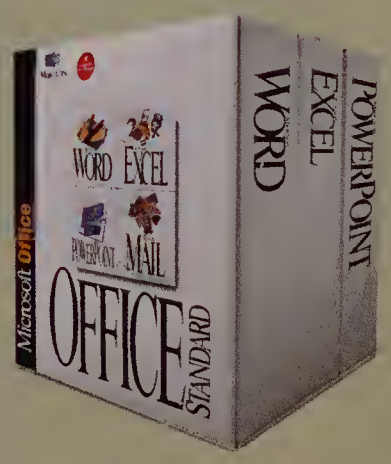
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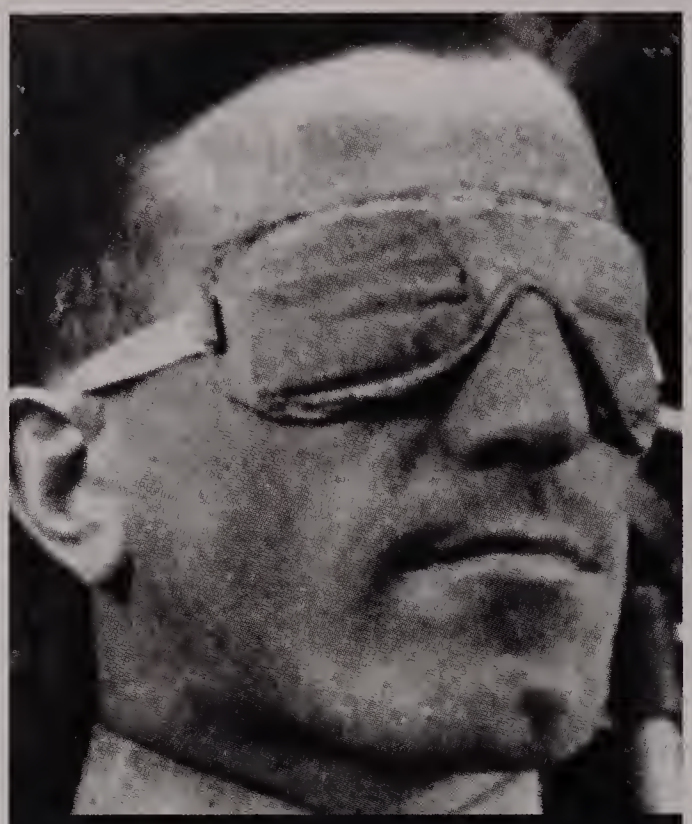
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Microsoft® Excel 5.0a.

You begin

With a hunch.

You begin

At zero.



1

You open a worksheet.
You type "Jan."
You use AutoFill
And the rest of the months
Are filled in for you.
Automatically.

2

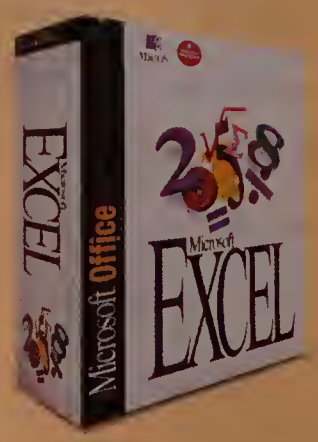
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You click AutoFilter
And the data you want to see
Rises to the top
So you can focus on
What you need to focus on.

3

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And dice your numbers.
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4

You see
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You come
To understand.
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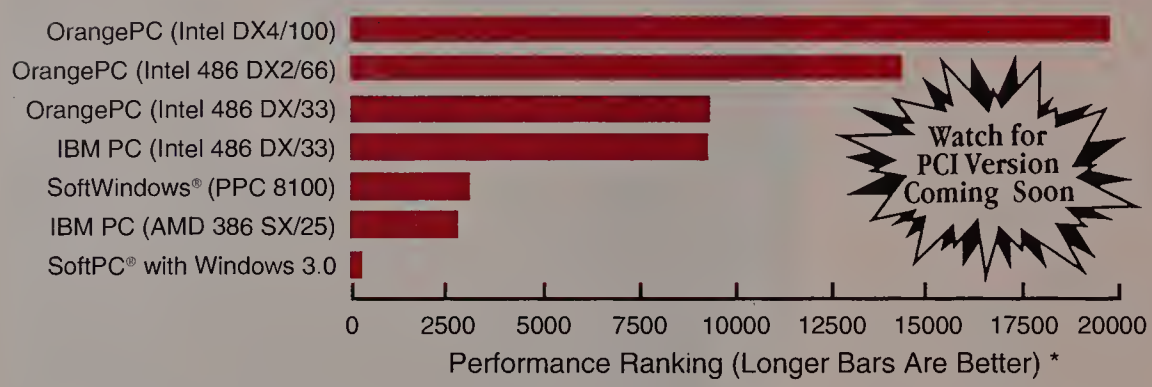


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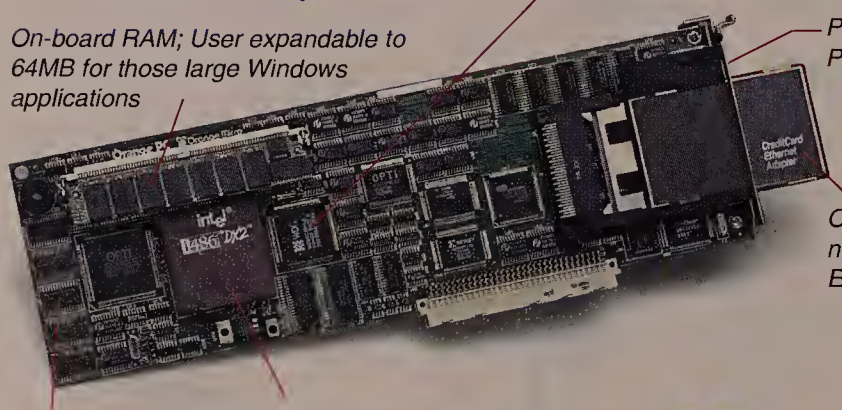
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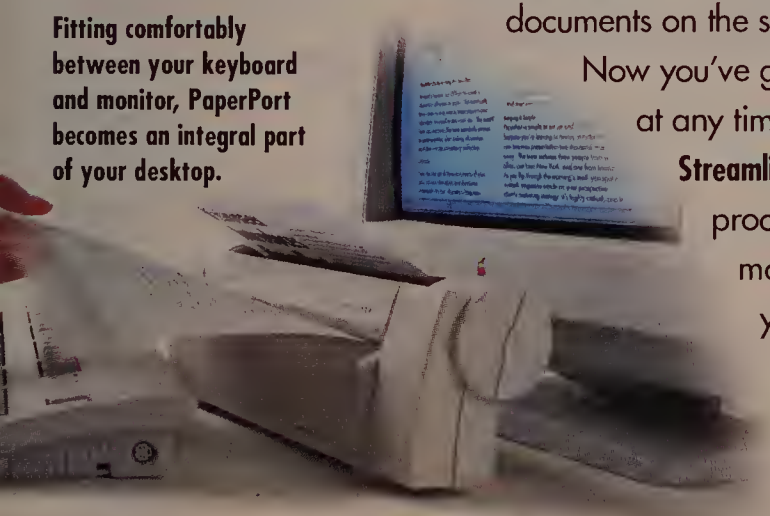
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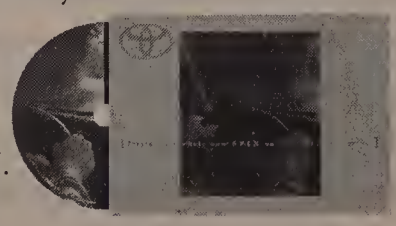
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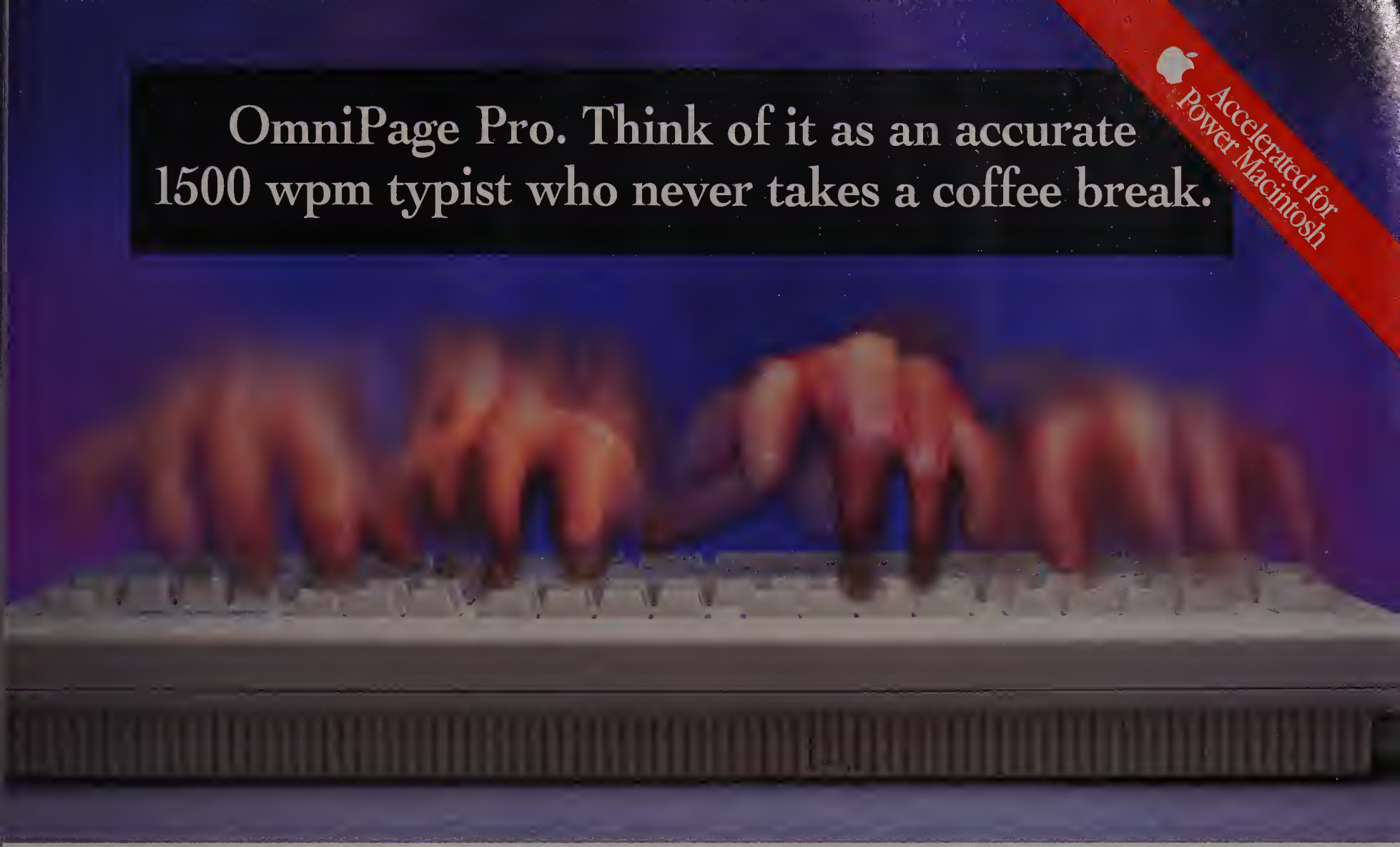
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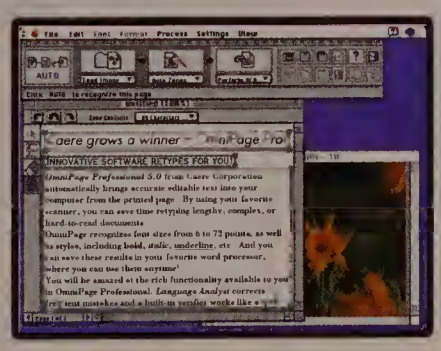
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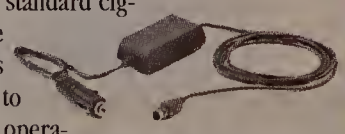
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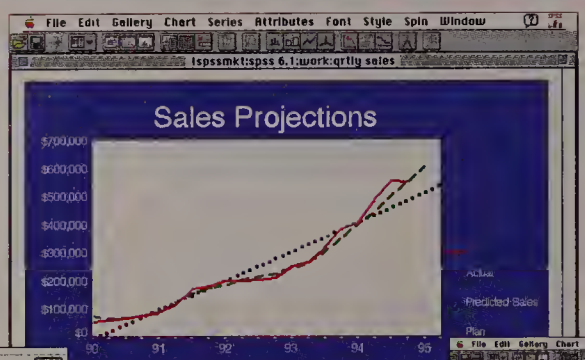
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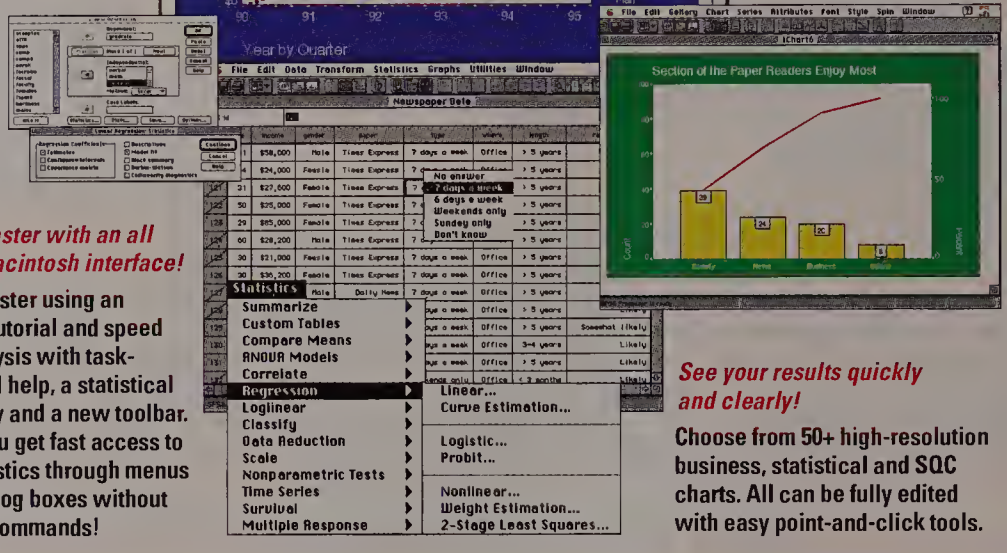
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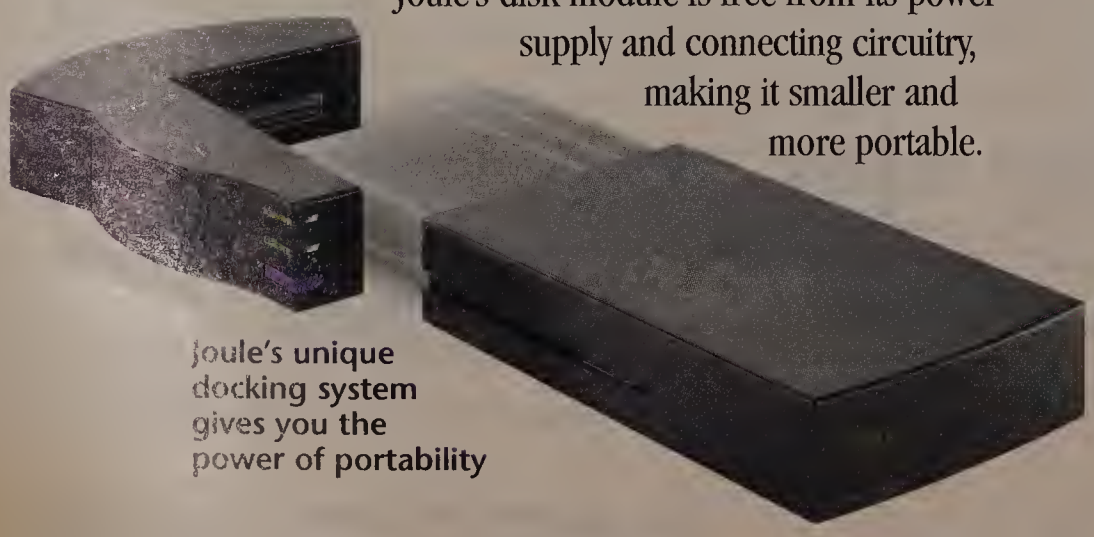
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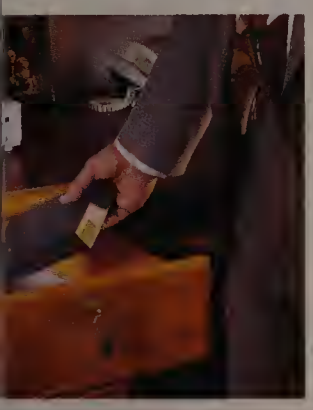
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BY ADRIAN MELLO

Software That We Use

What's inside Macworld's Macs—and why

AS WRITERS AND EDITORS, WE at *Macworld* spend countless hours evaluating Macintosh hardware and software products with a single purpose in mind—to help readers make the best possible buying decisions. Even so, we're constantly asked what software *we* use ourselves. So I finally decided to try to answer this question.

This turns out to be no trivial task. *Macworld* is not an especially large company, but its 100-plus employees operate in different departments such as editorial, design, circulation, ad sales, and production—each with a different set of requirements. Fortunately for me, our information-services department was just completing an audit of software and hardware and was able to provide me with recent profiles of every staffer's hard disk and a tally of the most frequently used applications. Even a cursory look at this data showed me that *Macworld*'s staff uses far too many products to list or even categorize, so this month I focus on just a few of the major categories of applications that account for most of our day-to-day work. (I'll talk about utilities, system enhancements, and the fun stuff in a future column.)

More than just *what* people use, I wanted to know how they *feel* about the software they use, so I informally polled the entire company. My query netted a boatload of comments. After poring over disk profiles and reading everyone's comments, I was struck by the individuality of computer use. That means you should take the following comments with a large grain of salt. Though thought-provoking, these individual remarks are highly subjective and not intended as advice. They reflect the feelings of users at *Macworld*. Only our published reviews provide our thorough and systematic assessment of a program's strengths and weaknesses.

War of the Words

The arrival of Microsoft Word 6 sparked a lot of commotion around here. Just as it dominates the marketplace, so Word is the dominant word processing program at *Macworld*. With software, our staff typically upgrades versions quickly to take advantage of the latest features and to avoid the confusion created by varied file formats. But early adopters of Word 6 warned their colleagues this was a product over the edge. After more people had a chance to try out the new version, the most common reaction was to stick with Word 5. Some people upgraded anyway to take advantage of Word 6's advanced features: as one contributing editor put it, "I need character styles, revision tracking, annotation, and scripting, and I need them badly. This program has the features I've been clamoring for, for years!"

Word 5 holdouts complained bitterly when they received files in Word 6 format. Not only could they not read the files, but they "would not be upgrading anytime soon." Even after the speed improvements in version 6.0.1, one editor wrote, "Out of principle and anger, I'm still not using Word 6. I love the auto-bullet and ,auto-numbering and auto–spelling-correction features in Word 6, but I'll try to get these elsewhere rather than use this product."



Quite a few users decided the time had come to investigate alternatives. Some settled on WordPerfect, Nisus, or WriteNow (causing those who had long ago abandoned Word in favor of these products to smile smugly). Others looked around but ended up back with Word 5.1. "After the hellacious experience with Word 6.0, I tried WordPerfect 3.1, but it's not as well implemented as Word," one editor said. She was particularly dissatisfied with WordPerfect's styles.

Database Dilemmas

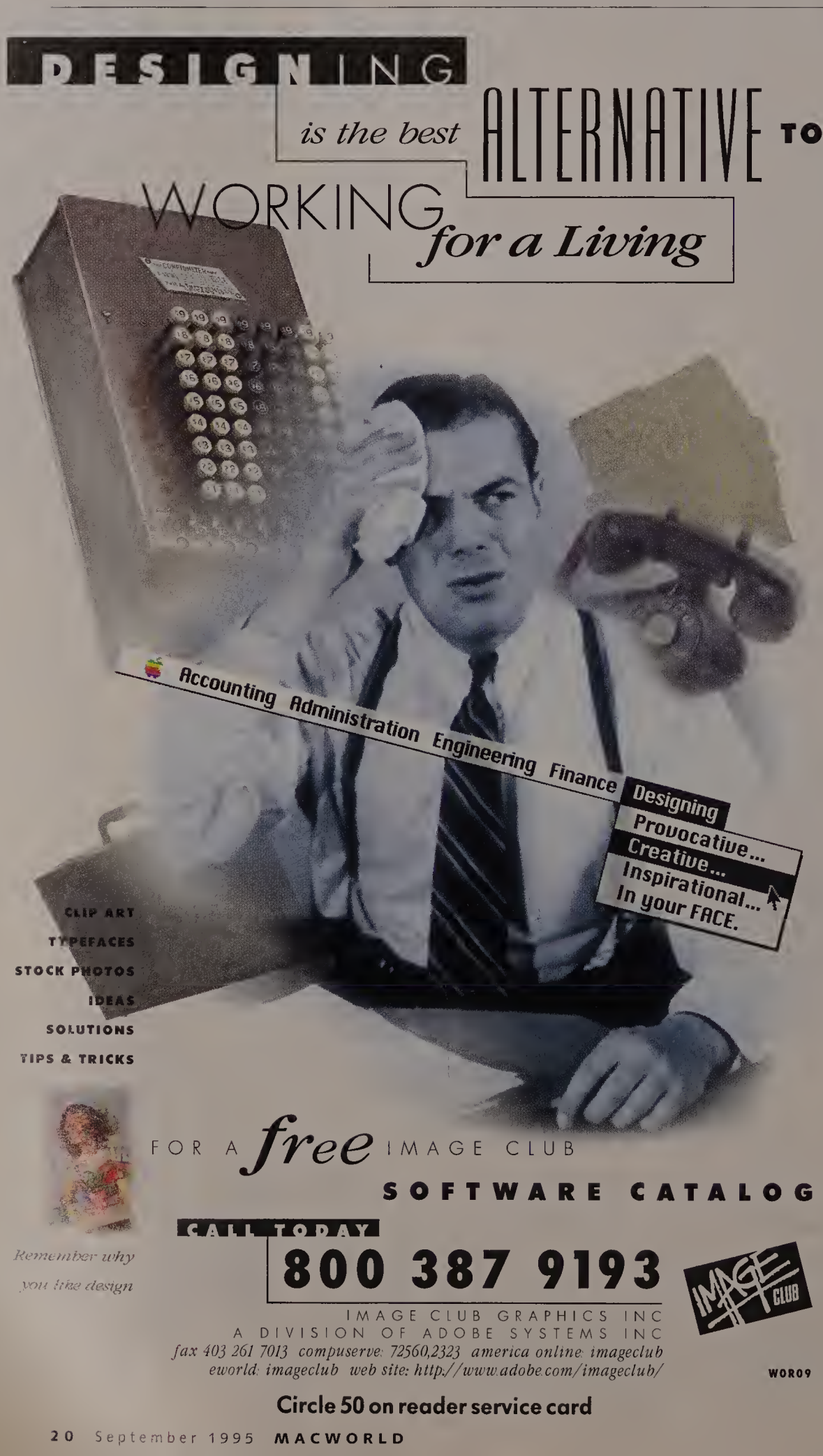
In the database-management arena, the main conflict we see is between Claris FileMaker's ease of use and Microsoft FoxPro's unique relational powers, which exact a toll of complexity. This comment, from a member of our editorial production department, is fairly typical: "FoxPro is our de facto corporate standard, but I use FileMaker wherever possible since I can hack it myself." Over the years *Macworld* has used a number of relational database programs, but no one, not even our programmers, has ever really been satisfied with them. Some time ago we switched from 4D to FoxPro. Now nearly half the *Macworld* staff uses FoxPro, but no one says anything nice about it. Some were downright disdainful: "I use FoxPro only for our one relational database and it's a dog: it crashes a lot, it has lots of glitches in display, and it is awkwardly designed for user interactions."

Our shared FoxPro database inspired a long soliloquy from an administrative assistant: "I characterize my relationship with FoxPro as a dysfunctional one. While I need to access FoxPro for numerous tasks, I find myself yelling over a coworker's cube partition for information rather than looking it up in the database. It demands that I quit other running operations to give it breathing room and yet it still insists on wigging out, giving me error messages and forcing me to quit and restart. . . . On the other hand, it gives my system a sort of humanity and

continues

gives me a scapegoat for my mistakes." An editor viewed his problems with *Macworld*'s FoxPro database less personally: "I need a relational database, and this is the one our programmer chose. Note that the end user and the programmer are not the same person, so when the database doesn't work quite the way I want it to, changes take longer to implement."

He's right to draw that distinction. Moreover, you can't compare FoxPro and FileMaker directly, because only the former is relational. I think what our users respond to in FileMaker is that it embodies the Mac's native virtues of approachability and elegance. It's one of *Macworld*'s real workhorses, and most of the people who use it adore it. One advertising salesperson called it her "lifeline. We've really put this database to the test and we're pretty darn happy with it, though I wish it could do groovy things like autodial and fax." An editor commented, "With some of the whizzes we have at *Macworld*, we can get FileMaker to do almost everything a relational database can do." He looks forward to the release of a relational version of FileMaker—and he's keeping his fingers crossed. Balancing usability and power is an especially daunting challenge for databases.



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Laying It All Out

Like most businesses, *Macworld* relies on core productivity applications like word processors, database managers, and spreadsheets (we couldn't live without Excel—end of story). But as a magazine publisher, we really take page-layout software through its paces. At one time we relied solely on Aldus PageMaker. Gradually we switched to QuarkXPress for some of the more design-intensive layouts, and now the magazine is designed entirely in QuarkXPress. Yet PageMaker still has its partisans, people who respect its elegant interface, ease of learning, and excellent customer support. We use it for some relatively simple jobs such as in-house communications and invitations, and some staff members choose it for personal projects.

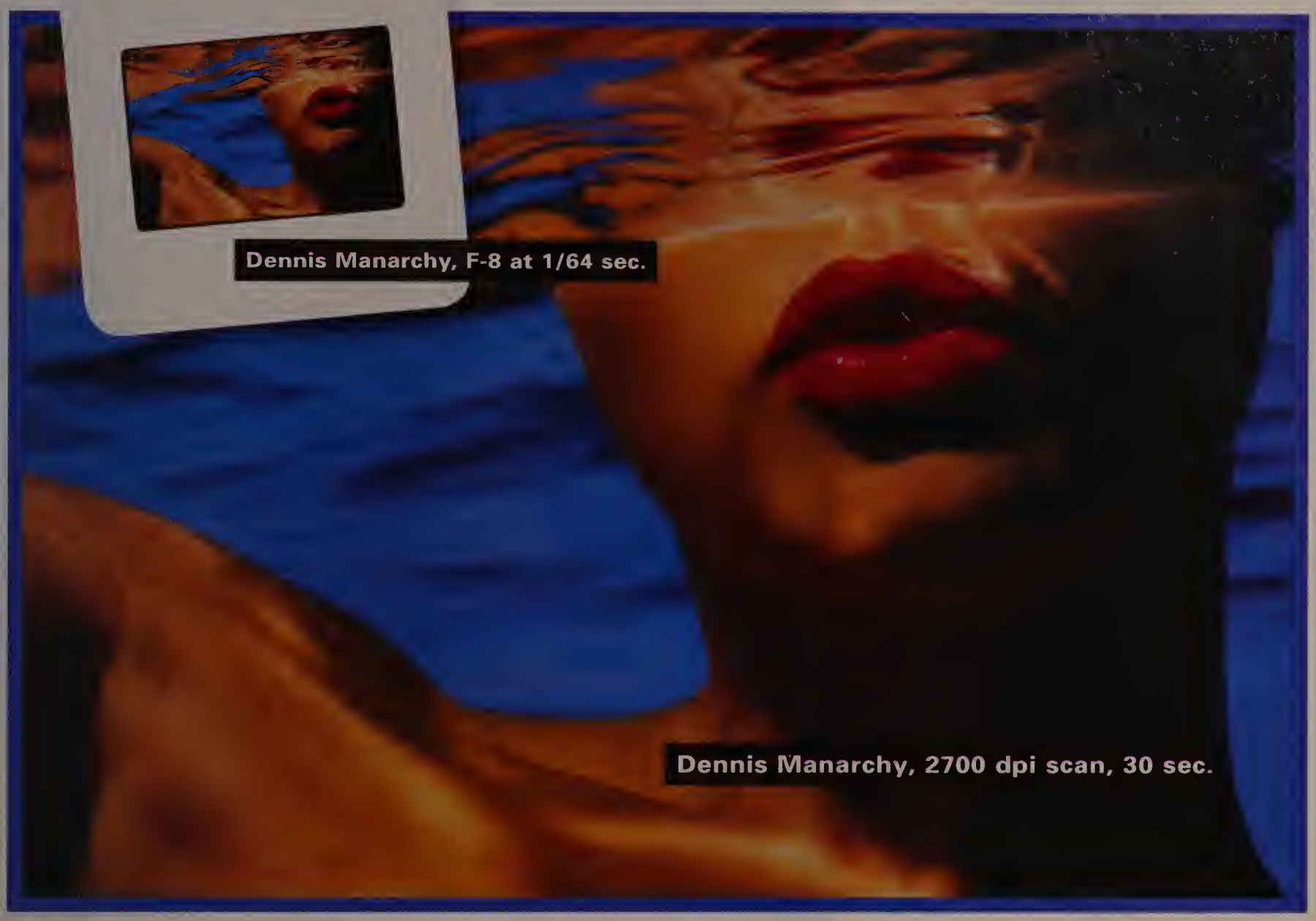
Still, when it comes to our demanding design and prepress work, QuarkXPress has won more hearts at *Macworld*. One designer commented, "By comparison, to me PageMaker seems clunky, tedious, and illogical. Quark's measurement palette tells you what's what when you arrange a section. You can organize multiple columns of type quickly and easily, trusting the program to line everything up for you. With PageMaker you have to painstakingly direct each one to its position and then hope it doesn't move when you're not looking." Another designer said QuarkXPress's many commands and controls, such as type rotation and arbitrary line widths, eliminate the need for workarounds.

Finding That Sweet Spot

This exercise really brings home how hard developers must work to figure out when users will willingly pay the price for additional features and when they won't. As customers, this is not our problem; we have a right to demand products that meet our needs. And though to developers we users may seem a fickle bunch, we genuinely admire programs that make sensible design trade-offs.

Still, as customers we should be careful not to expect a program to do things its developers never intended. This is the standard to which *Macworld* holds its reviewers. It's worth noting that most of the programs mentioned in this column received four stars in *Macworld* reviews. And that's our official opinion. **m**

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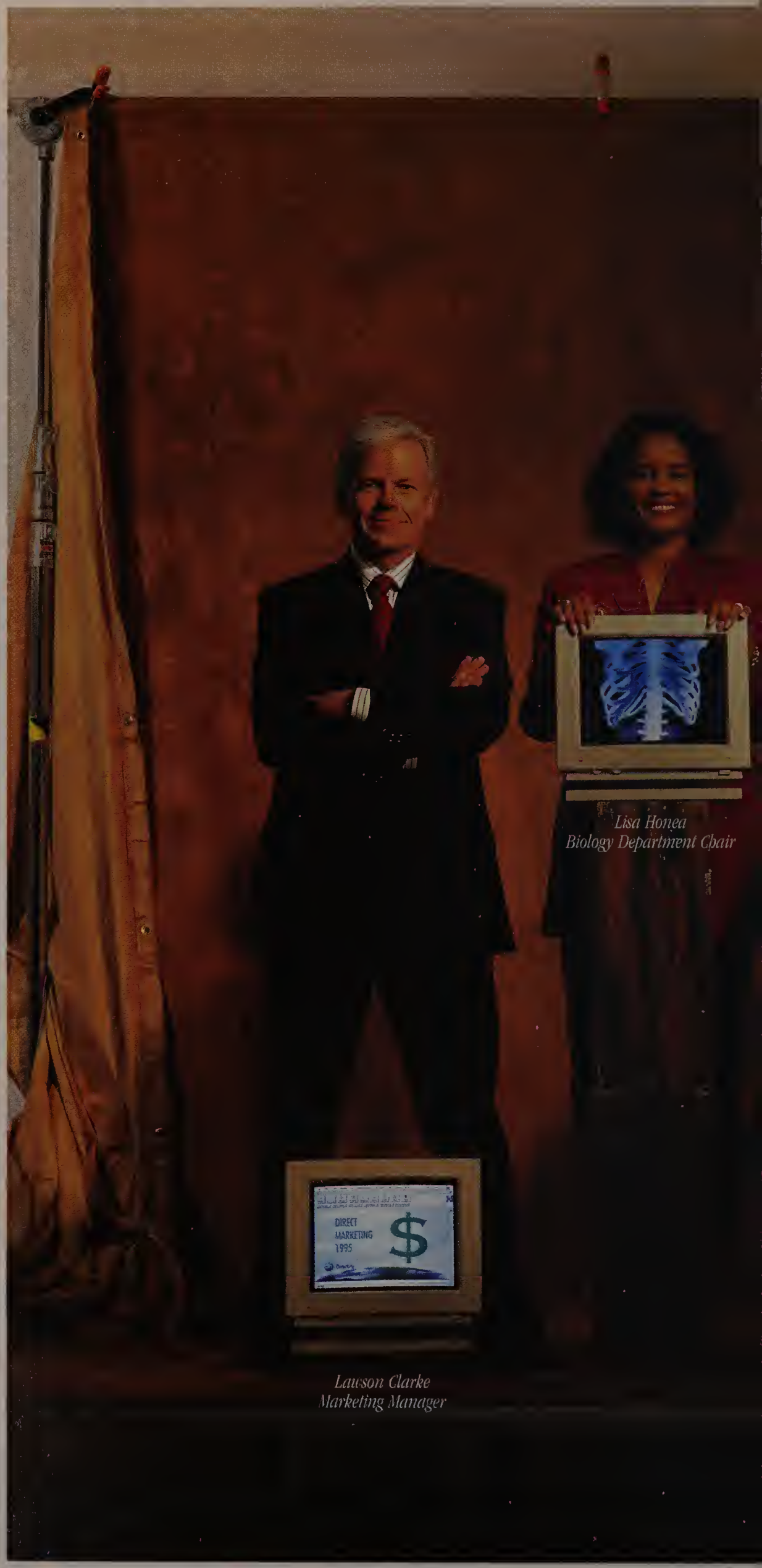
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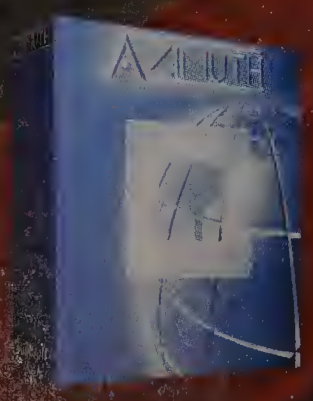
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Letters



Sound Advice

ONE FACTOR THAT YOU DIDN'T mention in "Quad-Speed CD-ROM Drives" (June 1995) is audio compatibility. As an owner of both an AppleCD 150 and an APS T3501 (4×)—as well as being a shareware author of audio-CD software (Audio Strip GH)—I know that there are significant differences in audio control quality between these drives. Apple drives ship with the AppleCD Audio Player, an elaborate, attractive program that allows, among other things, saving track titles and programmatic playback. The APS drive comes with a much more limited player, it does not support a smooth fast-forward mode, its driver is not 100 percent compatible with the Apple player, and you cannot easily use it to import QuickTime sound files directly from an audio CD as you can with recent Apple drives.

I certainly don't want to pick on APS in this regard; I am uniformly satisfied with the T3501 as a CD-ROM reader and with APS as a company. I am just using it as an example of problems users might consider when choosing between an AppleCD 600 or AppleCD 300 and a third-party drive.

Glenn R. Howes
via the Internet

According to APS, choppy fast-forward operation results when the CD-ROM is not connected to a dedicated SCSI bus. Testing of three different drives—including the T3501—on a Power Macintosh 8100/100 all produced the same choppy results.

APS's compatibility testing between the T3501 and Apple's CD-ROM driver and player produced no incompatibilities. APS agrees that the APT Audio CD player, which ships with the T3501, has fewer features than the Apple software, but anyone with an APS T3501 can use Apple's CD-ROM software and expect full compatibility.

APS invites readers with further compatibility questions to call APS Technologies at 816/483-6100.—Ed.

Still a Happy Mac

ADRIAN MELLO WAS A BIT PREMATure in writing the obituary for the happy-Mac icon (*State of the Mac*, June 1995). The new Mac OS logo only comes on after the start-up sequence begins, in place of the "Welcome to Macintosh" message. The happy Mac appears where it always has—when the Mac recognizes a start-up disk. And until Apple rewrites the ROM, that's where it'll be.

Robert Vasquez
via America Online

Our Sacrilege Is Showing

IN DAVID POGUE'S JUNE 1995 *DESKTOP Critic* article, "Your Roots Are Showing," he gave an incorrect name for the LDS Church, referring to it as the "Church of Latter-Day Saints." The proper name is The Church of Jesus Christ of Latter-day Saints. While this is a minor issue or nonissue to some, I would think your otherwise excellent publication would be more careful than that. David also referred to this church as a "company" when he stated they asked that Personal Ancestral File not be included in the article.

Bob Walker
via the Internet

Bad Netiquette

IN A RESPONSE TO A LETTER UNDER the heading "FTP, FPU Confusion," in the June 1995 issue, you recommend logging on to an FTP server as anonymous, and you say that you don't need a password. I find this a slightly irresponsible statement—it is considered a breach of netiquette if you do not use your E-mail address as the password when logging in anonymously. I'm aware that this convention is not enforced and often not followed, but it doesn't help if the idea of it being OK to not give your address is spread by a popular magazine.

Thomas Reed
via the Internet

Macworld Myopia

MACWORLD! SURELY YOU ARE JOKing! Auditing the three pictures on page 91 ("Top Office Printers," June 1995), I find that the middle picture is by far the most pleasant. Picking hardware based on these pictures alone, one would pick the product that produced the middle picture, but you chose the one on the left. Not trusting my own judgment, I asked my wife the same question. Answer: the middle picture.

Perhaps you mislabeled the pictures?

Charles Hussey
via the Internet

While the output sample that you like, from the Apple LaserWriter 16/600 PS, is brighter, the sample from the Lexmark Optra Lx shows finer details and smoother shapes, especially in the shadows.

continues

If you're tie-dye and they're black-tie—



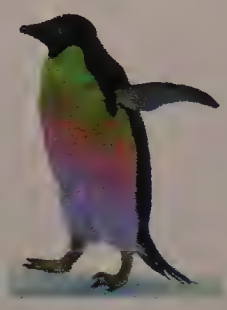
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CORRECTIONS

- *The system bus speed of the Power Macintosh 5200/75 LC was incorrectly listed in* News *("The Sleekest Desktop Mac Yet," June 1995). The 5200/75 LC's system bus runs at 37.5MHz.*
- *The $39 price listed for Netscape Navigator doesn't include a printed manual; the price with this manual is $59 (*Reviews, *May 1995).*
- *Personal Backup, which ships with Iomega's Zip drives, is published by SunStar, not Highwire as reported (*Reviews, *July 1995).*
- *The correct phone number for Quark is 303/894-8888 (*Graphics *news, August 1995).*
- *To connect two notebook computers via modem, the correct communications string for* (dial) *is ATD, not ADA (*PowerBook Notes, *August 1995).*
- *We mistakenly reported the latest Microsoft Office upgrade as 4.3.1; the current version is 4.2.1 ("Microsoft Fixes Up Office,"* News, *August 1995.*
- *The correct phone number for Gold Disk's VideoDirector 1.5 is 408/982-0200 (*Reviews, *June 1995).*

These differences are clearer in the original samples than they appear in the magazine. That said, both printers earned the Editors' Choice designation, and there's always room for individual preference.—Ed.

A Call to Clone Makers

WILL SOMEBODY PLEASE MAKE A Mac keyboard with a pointing stick similar to those common on MS-DOS laptops? Personally, I find this configuration (with a pencil-eraser–size joystick located between the G and H keys) ergonomically superior to even the PowerBook's touch pad. This is a great example of an opportunity for clone makers to distinguish themselves by offering alternative solutions.

One final request: make an ADB desktop version, too, so we touch typists can enjoy the benefits at home or in the office, as well as on the road!

Phil Natividad
via the Internet

Canadian Costs

I JUST THOUGHT I'D LET YOU KNOW that your $18 U.S. postage surcharge (or whatever it is) on Canadian subscriptions makes the cost (nearly $50 Canadian) prohibitive for those of us with limited budgets. Until you stop charging that ridiculous amount of money, I'll be forced to buy only the odd issue or two. Don't bother telling me it's for S&H, because I subscribe to a couple of other U.S. magazines (larger than yours and shipped via first-class mail) that only charge around $6 for S&H to Canada.

Another thing I have been wondering is when you people are going to set up a Web page like *MacUser*'s and *MacWeek*'s, with some articles and the table of contents from the print edition of *Macworld.*

Mike Schwartz
via the Internet

Macworld's home page debuts at the Macworld Expo in Boston. Give it a whirl—**http://www.macworld.com**.

Our Canadian subscribers pay higher rates for two reasons: postage and exchange rates. The subscription rate of US$36.97—$18.97 yearly rate plus $18 for postage from the U.S.—comes out to approximately Can$50, as you point out.

Why $18 a year for postage? We don't have enough Canadian subscribers to qualify for a cheaper postal rate, nor do we have a Macworld Canada publication to help us keep costs down.—Ed.

A Call for Programmers

AS A HIGH SCHOOL SOPHOMORE, I secured a bank loan and bought a Mac 128K for $3500 in 1984. Months later, in August of 1985, an accident left me completely paralyzed below my neck. I completed my rehabilitation, and my mother began researching available computer interfaces. She discovered a desk accessory called Screentyper that acts as a keyboard, allowing me to type via a hardware mechanism called Headmaster. The keys are arranged in two rows with most-used keys bunched toward the center. All the capabilities of a standard keyboard—the alphabet, digits, option, ⌘, and shift equivalents—are there.

When System 7.0 and the 68040 processor arrived, I discovered that Screentyper was incompatible with both. But more than that, Personics had been bought out, and Screentyper was summarily discontinued. I looked into alternative keyboard software, but everything I found was awkward—obviously designed by someone who did not have to use it.

My inability to use the latest hardware and System is stifling, to say the least. I also stand to miss out completely on such emerging technologies as Copland, OpenDoc, CHRP, and so on.

Eventually, I bought a Compaq. To

continues

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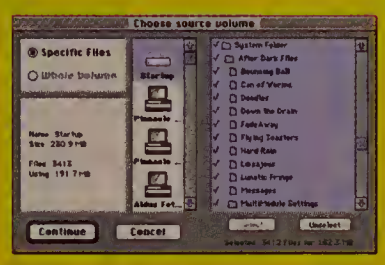


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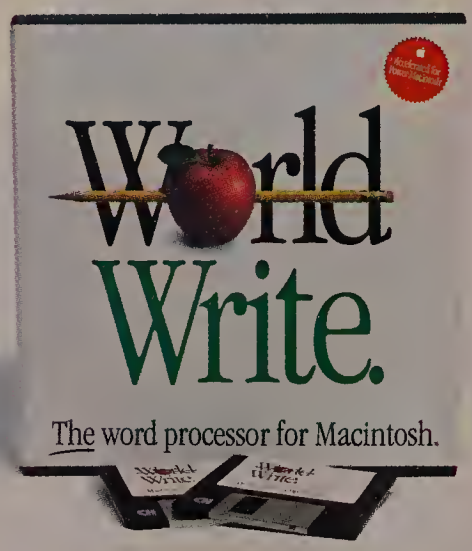
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my surprise, I found an incredible piece of software on my Windows desktop. WiVik is completely configurable keyboard software—everything from keyboard shape to number of and arrangement of keys. I simply read the manual and re-created Screentyper on my PC. Unfortunately, Windows will never equal the Macintosh OS. Even though I can use the same keyboard layout on the two platforms, I am twice as productive on my Mac IIci as I am on my PC.

So what does this all mean? Bluntly, I ask for your help, not only for myself, but also for thousands of individuals trapped in the same predicament. I'm searching for a Mac programmer to create a piece of software similar to Screentyper for the newer Macs and Systems, with updates for Copland, Gershwin, and beyond. I would even settle for a System 7–compatible likeness of Screentyper. I'm prepared to compensate a programmer at the going rate, whatever it is.

One day, when my schooling is finished, I hope to develop keyboard software for the Mac myself, and have it bundled with Mac system software. But that's another story.

Shannon Hollen
via the Internet

Anyone interested in learning more about hardware and software solutions for disabled computer users can call the Alliance for Technology Access (800/455-7970). More resources are listed in "Real Problems, Real Solutions" (*PC World*, November 1994).—Ed.

Hot-Site Backup

I JUST FINISHED READING "SUCCESSFUL Workgroup Backup" (May 1995). Thank you for a very informative examination of backup hardware, software, and procedures for preserving data integrity. *Macworld* always seems to present instructive articles decoding the arcane terminology that is pervasive in information technology vernacular. The only item I would add to your backup article is a discussion about off-site "hot sites" for restoring computer operations in the event of a catastrophic disaster. This site should be able to load backup media and restore users to normal working conditions. Such a plan is necessary in time-sensitive operations like customer service or order entry [not to mention publishing—Ed.]. There are third-party companies available that specialize in providing hot-site contingency hardware.

Thanks again for your fine article.

Dave Owen
via America Online

Too Many Tool Bars

I JUST INSTALLED THE NEW VERSION of Microsoft Word. Just for the hell of it, I opened all the tool bars. Remember that Word 15 spoof you ran a while back (*The Desktop Critic*, February 1994) that was all tool bars with a postage-stamp-size work area? Word 6 just made it a reality.

Luckily, you can turn them off.

Keith Buglewicz
via America Online

Both the picture and the column are available for download in the "Mentioned in Macworld" software library on America Online.—Ed.

Flying-Toaster Alert

I MIGHT BE THE ONLY COMPUTER GEEK religiously devoted to watching *Beverly Hills 90210* (along with my girlfriend, who got me hooked), but here's an interesting observation I made upon watching the latest episodes. . . . After Dark, the Microsoft Word of screen savers, seems to be the name of the local hangout for the kids of Beverly Hills. Plus, on the door of the club and all along the inside walls are the famous flying toasters. It appears Berkeley Systems is indeed ready for prime time.

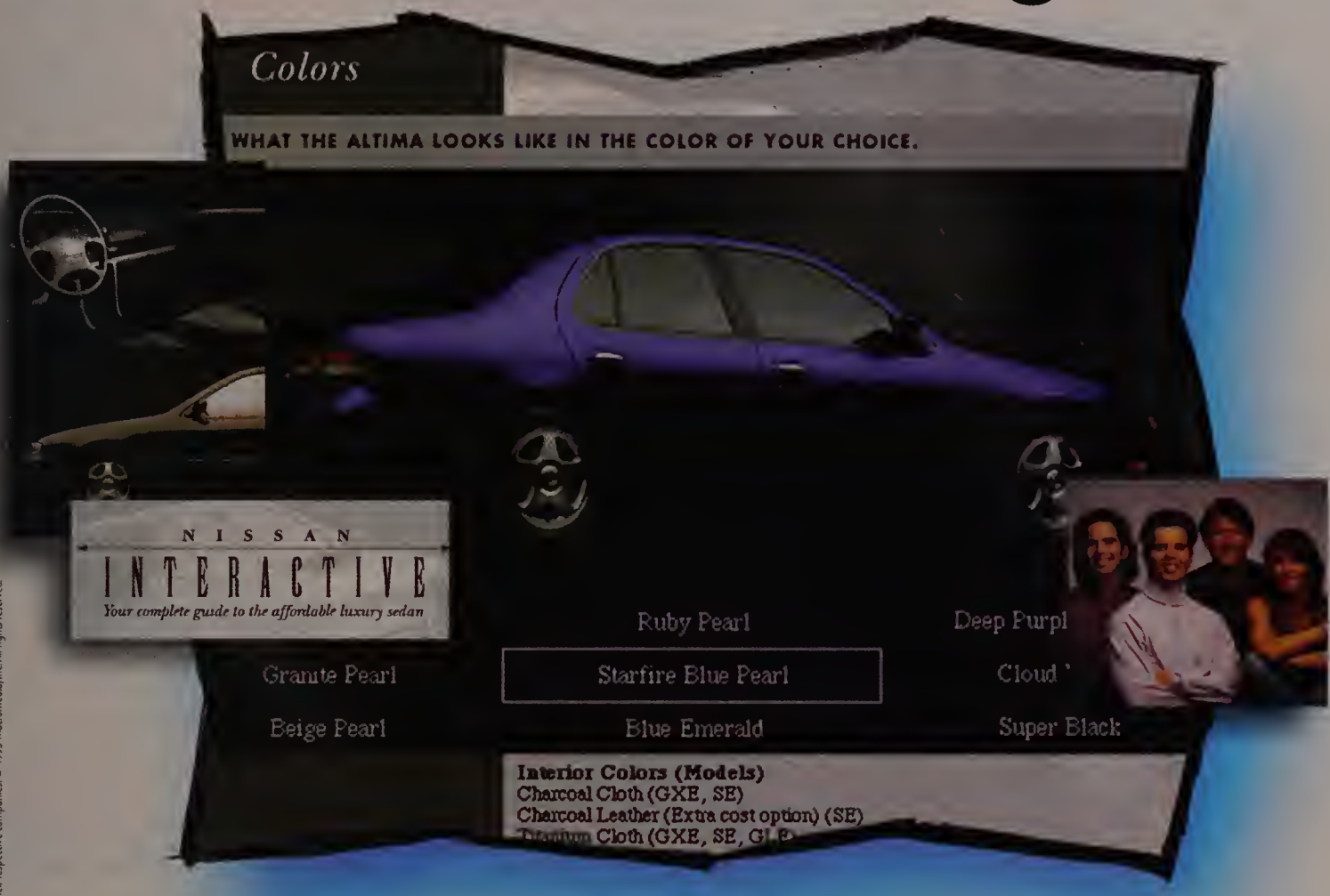
Dave Salvador
via the Internet

Nice try, blaming your girlfriend. *Macworld* editors, fingers on the electronic pulse of America, noticed the flying toasters scattered around our second-favorite teens' late-night hangout some time ago. We've also noticed that Melrose Place resident Billy insists on using a PowerBook as his desktop machine at the office, but we digress. Berkeley Systems spokesperson Monica Granados says the entire crew of *90210* are After Dark fans and originally approached Berkeley Systems for permission to use the famed winged toasters and screen-saver name. She says After Dark has also made appearances on The *X-Files* and *Murphy Brown*. Hey! Captain Janeway and crew could run into aliens piloting flying toasters on the far side of the galaxy . . .—Ed. m

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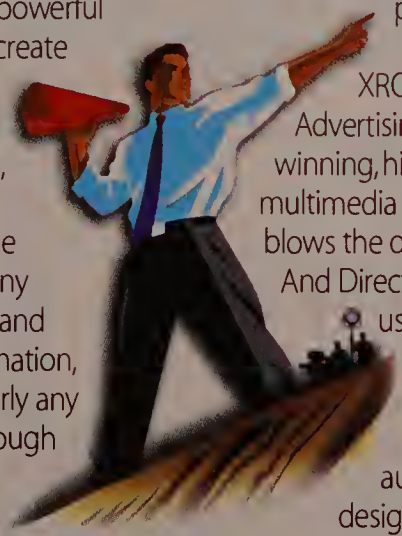
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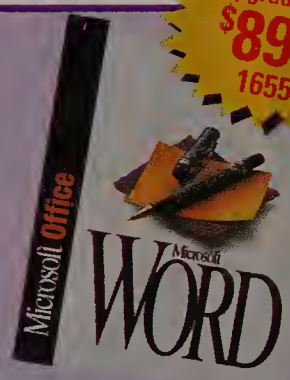
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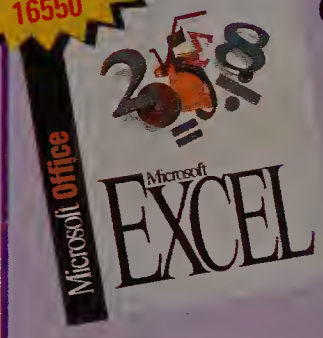
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LATE-BREAKING NEWS

MacBulletin

IBM Nixes Mac Clone After lengthy deliberations, IBM has decided not to license today's Macintosh hardware design and Operating System. Gary Griffiths, director of business development for IBM's Power Personal Systems, told *Macworld* that the marketing and sales-channel efforts would be too great to justify building an IBM-branded Mac clone prior to the release of the Mac OS on the converged hardware reference platform (CHRP). Apple expects to ship CHRP-based Power Macs in late 1996 or early 1997. IBM recently indicated that it intends to offer the Mac OS as an option on CHRP-based machines.

Quark Delays Software Revisions By the time you read this, Quark (303/894-8888) plans to have released a free maintenance upgrade (version 3.32) to QuarkXPress, available via online services.

But Quark will deliver several new programs later than expected. QuarkXPosure, an image-manipulation and -editing program jointly developed with Japan's JVC, is now expected to ship around January 1996, not August 1995. QuarkXPress 4.0 is likely to ship around February 1996, not this fall. And the multimedia-authoring adjunct to QuarkXPress, code-named Orion, is now expected to ship around March 1996, not September 1995. The delays are due to changes in the products' features and interfaces, as well as the integration of PixelCraft's ColorAccess color-separation software into QuarkXPosure. Quark would not confirm it, but it seems likely that ColorAccess will find its way into QuarkXPress 4.0, replacing the EfiColor software from Electronics for Imaging that is bundled with the current QuarkXPress version.

Also expected to ship around QuarkXPress 4.0's release are upgraded versions of two other programs: Passport, a multilingual version of QuarkXPress aimed at European users, and Quark Publishing System, a QuarkXPress-based workflow-management system for publishers. Orion and XPosure will be Power Mac–only programs, while the others will be available for both 680X0 and Power Macs, as well as Windows.

More Mergers Several companies have bought others, continuing a trend toward consolidation in the computer industry. Adobe Systems, which bought Aldus a year ago, has now purchased Frame Technology for $500 million. Frame's key product is FrameMaker, a multiplatform publishing program for creating paper and online documentation.

Adaptec, the largest SCSI card maker in the PC market, has bought Trillium, maker of well-regarded (and widely bundled) Remus RAID software for Macs.

Boca Research has purchased Hayes Microcomputer, the once-leading modem company that filed for bankruptcy last year. Boca will keep the Hayes product line as well as its Boca and Practical Peripherals lines.

After making an unwanted bid to buy Lotus Development, IBM reached an agreement with Lotus to acquire the software maker for $3.5 billion. Although Lotus makes several applications, like the spreadsheet 1-2-3 and the word processor WordPro (formerly named Ami Pro), IBM's interest was in Lotus's Notes system for exchanging mail, files, and electronic bulletin boards. Notes' closest competitor is Novell's GroupWise, which has a similar client and server makeup.

Delrina has agreed to be acquired by Symantec, the leading utilities company. Delrina dominates the Mac and Windows markets with its Fax Pro and WinFax fax software and with its FormFlow forms-design package. As Symantec has grown through several acquisitions over the last few years, it has cut back on developing new utilities and productivity software for the Mac. m

News

EDITED BY TOM MORAN

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Internet's Next Big Step



DAVID KAHL

While Internet browsers are becoming all the rage, they have the same limitations as most telecommunications technology: the content you browse—be it text files, page layouts, spreadsheets, presentations, or databases—is separate from the contents on your desktop. Apple plans to use its forthcoming OpenDoc technology to change that, letting you browse the World Wide Web, send E-mail, or transfer Internet files from within OpenDoc-aware documents and applications. A collection of OpenDoc *parts* (Apple's terminology for components) code-named CyberDog, lets users create documents that embed live links to almost any Internet resource. (For details on OpenDoc, see "OpenDoc and OLE 2.0," *Macworld*, November 1994.)

For example, say that you need to track the cost of producing a breakfast cereal based on the prices of wheat, tiny marshmallows, and cardboard boxes. Prices constantly change, and you want to keep your spreadsheet current with the least amount of effort. CyberDog will let you build a document with embedded Internet links that constantly fetch and display the most recent price information available from the Internet. Rather than making you hunt down the information yourself, CyberDog gets it automatically.

Although OpenDoc appears to hold enormous potential to change the everyday experience of computing, some early examples of OpenDoc components—such as a spelling checker that any application could use—didn't really show anything revolutionary. Instead, they were small refinements to current approaches. But CyberDog really shows how OpenDoc can help transform the computing experience.

It aims to make using the Internet as easy as launching a Read Me file. And it aims to make including Internet-based information and links in an electronic document as easy as including clip art.

For example, while a teacher searches the Internet for information about hurricanes, CyberDog's Log part could automatically track all Internet sites that the teacher accesses. Later, the teacher could sort log files chronologically, alphabetically, or by type of site.

The teacher could then create a ClarisWorks document about hurricanes that in addition to text contains the most recent satellite photo of the Caribbean from a constantly updated Web site, a link to a Usenet weather newsgroup, and links to appropriate FTP sites. The satellite picture would automatically update, and clicking on the links would let students connect with the correct Internet resource.

Building the Internet links would take only a few simple steps. For example, to build the link to the weather newsgroup, the teacher would create a button in the ClarisWorks document by dragging a button icon from an OpenDoc button tool onto the hurricane document. Then the teacher would drag the icon representing the URL (an address to a Web page) for that group from CyberDog's log onto the new button and label the button Weather Talk. The final document could then be distributed to and used by CyberDog-equipped computers that don't have the teacher's original log file. Students who click on that button would automatically be brought to the newsgroup without leaving ClarisWorks.

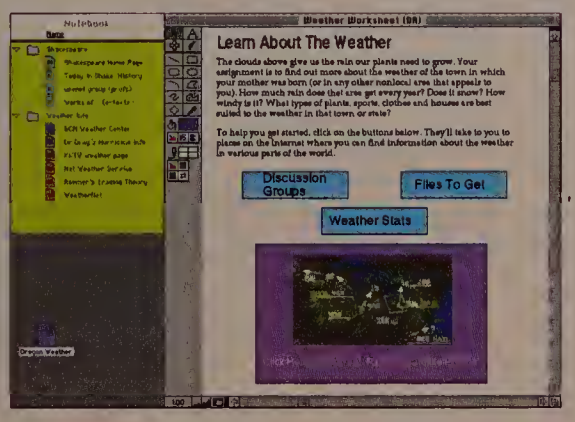
In business use, after a session of Net surfing you could drag log files of all relevant Internet resources into a CyberDog notebook file that would look much like the current Note Pad DA. A long URL such as **http://www.unitedmedia.com/comics/dilbert** could be given a shorter name such as Dilbert Site. Double-clicking on a notebook entry would bring you to that Internet location. The text-file–size notebooks could be given to other CyberDog users, freeing users from having to hunt down the sites you discovered.

Even more simply, log items could be dragged onto the desktop where they would appear as standard file icons. A busy executive, for example, could have an icon that connects to a Web page displaying the latest baseball box scores or stock prices.

Apple says CyberDog doesn't force new standards or protocols on the Internet. Instead, Apple wants to make existing standards easier to access. Therefore, Apple plans CyberDog parts to support the Web, FTP, WAIS, Gopher, and E-mail, along with viewers for data types such as GIF, JPEG, and sound files. Apple hopes other developers will build OpenDoc parts to support other capabilities or emerging technologies—such as MUDs (multiuser documents), Adobe Acrobat, or VRML (Virtual Reality Modeling Language)—that Apple's CyberDog collection won't provide support for.

But for CyberDog to become more than a clever alternative to existing Internet tools such as Mosaic and Sparkle, Apple needs third-party developers to integrate OpenDoc support into their current and future productivity applications. And the enthusiastic reception of CyberDog at Apple's recent developers conference may help shift some companies from merely announcing OpenDoc support to actually shipping OpenDoc software.

By bringing new capabilities to Macintosh computing, rather than just enhancing existing capabilities, CyberDog shows the potential of OpenDoc to change the way users interact with and share data. CyberDog gives developers and users a compelling example of what OpenDoc can do.—JIM FEELEY



CyberDog will let you create hot links in documents to resources on the Web, as this mockup shows.

Radius Unveils New Clone

A MOVE TO THE MASS MARKET

Radius engineers have been burning the midnight oil, and by the time you read this the company expects to be shipping its second Power Macintosh clone, dubbed the 81/110.

The 81/110 is a stripped-down version of Radius's System 100—which is to say it's nearly identical to Apple's Power Macintosh 8100/110. The 81/110 sports a 110MHz PowerPC 601 CPU, three NuBus slots, 16MB of RAM (72-pin SIMMs), a 2GB hard drive, built-in Ethernet via an AAUI port, and a quad-speed CD-ROM drive. The 81/110 will not come with a video card in the PDS slot, so resellers have the opportunity to customize the system, presumably with Radius components. Radius (408/541-6100) expects the 81/110 to carry a street price of around $5600. Company executives have also hinted that a version of the 81/110 using the Telecast professional video system might be in the works, but would not commit to a time frame.

Radius's executive suite has also been busy: in June, Radius announced an exclusive two-year agreement with distribution-channel juggernaut Ingram Micro. Ingram will distribute all of Radius's CPUs throughout North America. Also, Radius will pay IBM to manufacture motherboards and complete systems for Radius clones. This relationship in no way involves IBM's licensing the Mac OS for IBM-branded clones.
—CAMERON CROTTY

In Brief

Help for Mobius Customers

Sonnet Technology (714/261-2800) is supporting and selling an accelerator card from the defunct Mobius. Owners of the 40MHz Speedster 040 card can call Sonnet for technical support and software upgrades. Sonnet will sell Mobius's accelerator for the Mac II line for $399 and is shipping an improved version of the card with System 7.5 compatibility.

Simultaneous Data, Voice Calls

In an unusual display of cross-hardware connectivity, Apple joined IBM and AT&T at the recent PC Expo to demonstrate how Macs can link with telephone switches from AT&T and Siemens-Rolm, using the Versit standard. Developers incorporating the standard into their applications will be able to route data coming in through a telephone switch to users' computer screens simultaneously with the call. For instance, a caller's phone number can be identified through caller-ID technology, or when the caller punches an account number on the telephone keypad. That in turn triggers a database search of a customer account.

Internet "Decency" Promoted

A bill passed by the Senate in June would hold phone companies, commercial online services, the Internet, and bulletin board services liable for obscene or harassing content they transmit, including E-mail, binary files, and posted messages. At press time, the House of Representatives was considering a less severe bill.

Meanwhile, Microsoft, Netscape Communications, and Progressive Networks have formed the Information Highway Parental Empowerment Group (IHPEG). The group aims to create industrywide standards to let parents prevent their children from accessing certain materials and to let content providers and rating services assess material's appropriateness.

More Power for Performas

APPLE ADDS TWO MODELS, BEEFS UP THREE

With the mid-July release of two new Performas, Apple has begun the serious transition of its home-oriented Performa line from 680X0 to PowerPC CPUs. The new all-in-one Performa 5200 and the flat, desktop Performa 6200 join the previously released Performa 6100 in the Power Mac home family.

The Performa 5200 is the same machine as the Power Mac 5200 LC, introduced for education buyers this spring (see "The Sleekest Desktop Mac Yet," *News*, *Macworld*, June 1995), while the 6200 is the same product recently released in Europe under the same name (see "Apple Unveils Power Mac 6200 Series," *MacBulletin*, July 1995).



SCOTT PETERSON

The Performa 6200 joins the Power Mac family.

The 5200 series uses a 75MHz PowerPC 603 CPU and has 8MB of RAM (expandable to 64MB). The 5200CD model with an 800MB hard drive costs $2000, while the 5215CD model with a 1GB drive costs $2300. It comes with a built-in monitor, mouse, and standard Apple keyboard.

The 6200 uses the same motherboard as the 5200 but comes in a more traditional desktop case, similar to that of a Performa 630. There are five models: the 6200CD has 8MB of RAM, a 1GB hard drive, and a 15-inch monitor; the 6216CD is a 6200CD without the monitor; the 6220CD is a 6200CD with 16MB of RAM and video-in jacks, but no monitor; and the 6230CD is a 6220CD with an MPEG card and a 15-inch monitor. Prices range from $2400 to $3000.

All the new Performas include a quad-speed CD-ROM drive, a 14.4-Kbps internal fax modem, and Performa 630–style video-in and communication slots. Apple also has a new Performa 6100 variant with a larger hard drive.

These new Performas signal the end of further 680X0-based Performas, although Apple continues to sell the Performa 630 (now available in the 631CD model, which offers a larger hard drive than the 630) and has introduced the Performa 640 DOS Compatible, which is essentially the same machine as the LC 630 DOS Compatible released earlier this spring.—MICHAEL FAINTER AND GALEN GRUMAN

Who Needs Visual Basic?

FINALLY, MAC TOOLS TO LET ANYONE PROGRAM

When Windows users can't find software that meets their specific business needs, they can turn to tools such as Microsoft's Visual

SPECIAL REPORT

First Add-on Cards for the New PCI Macs

Macintosh professionals already have more PCI graphics and SCSI accelerators to choose from than they ever did NuBus accelerators, and in other product areas such as networking, digital video, and specialized cards, the number of PCI vendors equals the number working in NuBus. Thanks in large part to the influence of Windows developers in this market, PCI card prices are also lower than NuBus card prices in many cases.

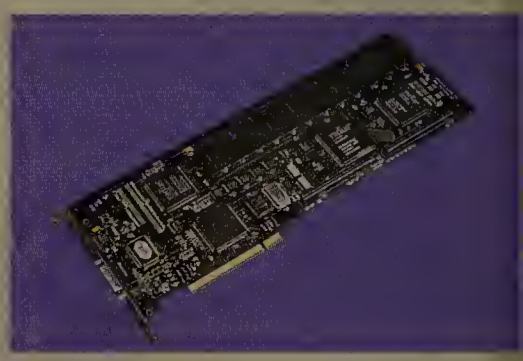
Graphics

• **ATI Technologies** offers two graphics cards. The Xclaim GA 4MB supports 24-bit color at resolutions up to 1152 by 870 pixels and 16-bit color at 1600 by 1200 pixels. The company also sells the Xclaim GA 2MB, which supports 24-bit color at up to 832 by 624 pixels and 8-bit color at up to 1600 by 1200 pixels. A $249 memory module lets you expand the 2MB card to 4MB. The 4MB card costs $649, and the 2MB card is $449. 905/882-2600.

• **Diamond Multimedia** is selling the $569 Mac Multimedia Accelerator, which includes 4MB of VRAM and supports 24-bit color at resolutions up to 1152 by 870 pixels and 16-bit color at up to 1600 by 1200 pixels. The card also offers QuickTime and MPEG-1 software acceleration and scaling. An optional daughtercard (price not determined at press time) provides hardware MPEG-1 decompression, dual video windows, and live video viewing from NTSC or PAL sources. 408/325-7000.

• **EA Research** plans two graphics cards (as yet unnamed), both of which aim to provide faster performance than the Power Mac 9500's built-in video. One card released in June, offers 4MB of VRAM with a maximum 24-bit resolution of 1152 by 870 pixels at 75Hz, and a maximum 16-bit resolution of 1600 by 1200. The other card, available in September, will include 8MB of VRAM with a maximum 24-bit resolution of 1600 by 1200 pixels at 75Hz. An included daughtercard will accelerate Photoshop, QuickDraw, and QuickDraw 3D routines. Both cards will offer energy-saving features and will include ColorSync 2.0. The 4MB card will cost $695; the price of the 8MB card has not been decided. 510/867-0697.

• **Radius** moves to PCI with three graphics cards. The ThunderColor 30 series cards with the included 4-DSP ColorEngine daughtercard accel-



The Radius PrecisionColor 8/1600 costs $599.



PETER HOEY

Basic and build their own applications. But Macintosh users don't enjoy an equivalent broadly supported programming tool; and Microsoft doesn't plan to port Visual Basic to the Mac.

To break into the corporate mainstream, Apple must ensure that businesses can find cross-platform custom-application-development tools that run on Macs and Windows computers. And those tools must exceed the standard set by Visual Basic—the program often used to give desktop machines access to a corporation's crucial custom software.

That effort is finally starting to happen: as Visual Basic reaches the ripe old age of version 4.0, Apple, IBM, Novell, Oracle, PowerSoft, and others are developing new user-programming tools for the Macintosh that take aim right at Microsoft's programming juggernaut.

Two of the upcoming Mac programs, Novell's AppWare 2.0 and the Apple/IBM Denáli project, step beyond the client-server mainstay of corporate development and let users build their own OpenDoc components, aiming to let businesses add custom functionality to any OpenDoc-aware application. The companies believe that taking advantage of OpenDoc will let businesses build better tools with less effort.

These programming tools aren't as difficult to master as low-level languages like C and C++, but neither are they designed to create shrink-wrapped commercial software. Instead, you use them to build front ends to minicomputer databases (such as Oracle, Sybase, and Informix) and other custom business applications.

At least six new Macintosh business programming tools are planned:

- Apple (408/996-1010) and IBM plan to attack Microsoft head-on with an OpenDoc-development environment, code-named Denali, that will bring visual programming in BASIC to the Mac (as well as to OS/2, AIX, and Windows). Users will work with a scripting language similar to Visual Basic to build OpenDoc parts and integrate them into complete programs. The companies say their environment will run many Visual Basic applications (but initially not those with VBXs, a direct hook into Windows). Denali will support the Open Database Connectivity (ODBC) standard and eventually support Open Scripting Architecture. Apple says the product will be available by May 1996.
- AppWare 2.0, Novell's cross-platform visual-development tool, lets users create applications and parts with canned software modules. Novell (801/429-7000) says that most Mac owners can master AppWare, which builds NetWare network applications as well as stand-alone programs. Version 2.0 for the Macintosh is promised by the end of 1995, with the Windows version to follow in 1996. The price is not yet set.
- Peregrine, by Pictorius (902/455-4446), aims to let users create and compile client-server applications without writing code. Based on the

continues

THE AMCOEX INDEX OF USED MACINTOSH PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
PowerBook 140/4MB/40MB	$625	–$25
PowerBook 165/4MB/80MB	$1050	+$25
PowerBook 180/4MB/80MB	$1325	–$25
PowerBook Duo 230/4MB/80MB	$750	+$25
Mac Classic II/4MB/40MB	$425	–$25
Mac LC II/4MB/40MB	$325	0
Mac IIsi/3MB/40MB	$350	–$50
Mac IIci/4MB/80MB	$650	–$25
Mac IIfx/4MB/80MB	$625	–$25
Centris 650/8MB/230MB	$1175	–$25
Quadra 900/8MB/160MB	$1675	–$100
Power Mac 7100/66/8MB/350MB	$2250	+$50

Index provided by the American Computer Exchange of Atlanta (800/786-0717). It reflects sales during week of June 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

rates Photoshop tasks. The ColorEngine also accelerates CMYK redraw to speeds comarable to RGB redraw. The ThunderColor 30/1600 suports 1600 by 1200 pixels at 24 its and costs $2499. The ThunderColor 30/1152 suports 1152 by 870 pixels with 4-bit color (1600 by 1200 ith 8-bit) and costs $1999.

The Thunder 30 cards ck the ThunderColor's olor Engine daughtercard, ut are otherwise the same. he Thunder 30/1600 costs 1499. The Thunder 30/1152 osts $999.

The PrecisionColor 8/1600 ffers 24-bit QuickDraw accelration and supports 1600 by 200 pixels with 8-bit color nd 832 by 624 pixels at 24 bits. Vith an added 2MB of VRAM, ie board supports 1152 by 870 xels at 24 bits. It costs $599.

All Radius PCI graphics rds offer ColorComposer olor-management software. 08/541-6100.

SCSI

- **Adaptec** has shipped the AHA-2940W Wide SCSI accelerator. The card supports SCSI transfers up to 20 MBps and supports up to 15 SCSI-2 devices simultaneously in both asynchronous and synchronous modes. It costs $500. 408/945-8600.
- **Atto Technology** rolled out the ExpressPCI SC and ExpressPCI MC SCSI cards. The ExpressPCI SC has one SCSI Fast/ Wide port, while the ExpressPCI MC has two SCSI ports. Together, the MC's two ports support up to 15 SCSI devices. The ExpressPCI SC costs $395, and the ExpressPCI MC is $895. 716/691-1999.
- **Distributed Processing Technology (DPT)** introduced three SCSI cards and two RAID controllers. The SmartCache III SCSI cards—available with standard, Fast, or Fast/Wide support—offer optional support for up to 64MB of hardware cache with standard or Error Correction Code–protected SIMMs. An optional daughtercard gives the boards hardware RAID levels 0, 1, and 5. The SCSI-1 SmartCache III PM2024-Mac is $395; the Fast SmartCache III PM2124-Mac, $595; and the Wide SmartCache III PM2124W-Mac, $695.


Atto's ExpressPCI cards are available with either one or two SCSI ports.

The SmartRAID controller integrates the hardware RAID and hardware cache support into a single card. Expansion

continues

visual Prograph CPX programming tool, Peregrine will be available by October in a $1495 single-user version and a $2495 multiuser version that includes links for Sybase and Oracle databases. Pictorius plans to add features such as a Power Mac–native compiler and links to other databases soon, with OpenDoc support coming in 1996.

• Oracle (415/506-7000) plans to bring its first low-end development and client-server tool to the Macintosh by October. The company says that Power Objects will be similar to Visual Basic but will make more use of object-oriented technology, provide superior database access, and build compiled applications. A stand-alone version of Power Objects will cost $399; a network version will cost $1999.

Oracle also plans to bring its $3995 Developer/2000 enterprise development environment to the Macintosh by the end of the year. Developer/2000 will include OpenDoc features by early 1996, the company says.

• PowerSoft's (508/287-1500) PowerBuilder 4.0, a popular client-server development tool for Windows users, continues its three-year-plus beta cycle on the Mac. The company says that, despite the long delay, it remains committed to bringing out the product. But PowerSoft won't estimate when this might happen. PowerBuilder 4.0 for Windows costs $3295 in a single-user configuration.

• Other companies working on Macintosh development tools for corporate use include Andyne, Gupta, ParcPlace Systems, and Uniface.

—JIM FEELEY

BUGS & TURKEYS

FreeHand 5.0, from Macromedia (214/680-2060), is painfully slow opening files on a server storing both 4.0 and 5.0 documents—taking up to several minutes to open a file. The current version, 5.0.1, does not address the problem; support technicians hope it will be addressed in a future release.

If you schedule an alarm in Claris Organizer (Claris, 408/987-7000), make sure your computer is left on. The program won't display at start-up alarms that went off while the Mac was shut down. Users can only hope this feature is added in a future version.

The 6115CD CD-ROM drive from Apple (408/996-1010) can't accommodate a keyboard in front of its pizza-box–size CPU—the CD tray doesn't clear the top of the keyboard. If you're not careful, the keyboard also pushes against the CD's eject button while you type.

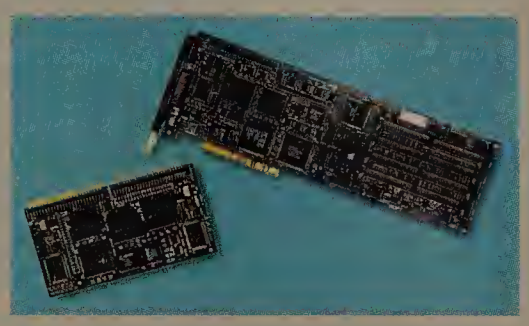
Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-shirt if we shoot your turkey in this space. See *How to Contact Macworld.*

SPECIAL REPORT

"First Add-on Cards for the PCI Macs," continued

modules allow the cards to support up to three Fast/Wide SCSI-2 or Fast channels, and thus multiple RAID systems. The SmartRAID PM3224 Fast card costs $1795; the SmartRAID PM3224W Wide card, $1995. 407/830-5522.

• **FWB** offers the $450 PCI SCSI JackHammer, a SCSI-2 Fast/Wide accelerator. The card is optimized for SCSI Manager 4.3 and is fully compatible with System 7.5. FWB includes the PCI SCSI JackHammer in its SledgeHammer VS for PCI and Sledge-Hammer FT for PCI RAID systems. 415/325-4392.



The SmartRAID cards by DPT include hardware support for RAID levels 0, 1, and 5.

• **MicroNet Technology** has shipped the Raven Professional SCSI accelerator. One version has one SCSI channel and costs $595; the other version has two channels, supporting RAID 0 (no price was set). 714/453-6000.

• **Western Digital** has three SCSI accelerators that are compatible with SCSI-2 and SCSI-3 devices and offer direct memory access (DMA). The Fast WD7193 costs $249. The Wide WD7197 costs $299. The Wide WD7296 has five DMA channels, and costs $329. 714/932-5000.

Networking

• **4-Sight** offers the $1695 SCII ISDN card. Bundled with iSDN Manager, it costs $2795. 515/221-3000.

• **Asanté** includes four LEDs on its $269 Asanté-Fast 10/100 PCI Adapter, to aid in troubleshooting. 408/435-8388.

• **Dayna Communications** plans to release the DaynaPort 10/100 Ethernet PCI card by September, for about $260. 801/269-7200.

• **Efficient Networks** will port its ENI-155p ATM adapter by the end of the year. 214/991-3884.

• **Farallon's** Fast EtherTX-10/100 Fast Ethernet card uses a 3Com chip set to take advantage of 3Com's Parallel Tasking technology. The company's estimated price is $249. 510/814-5000.

• **Interphase** offers the 5515 PCI ATM adapter card for $650. 214/919-9000.

Digital Video

Companies that have announced plans to offer PCI-based video-editing hardware for PCI Power Macs include Avid (508/640-6789), Data Translations (508/460-1600), Intelligent Resources (708/670-9388), Interactive Images (719/598-3894), Radius (408/541-6100), and RasterOps Truevision (317/841-0332). Contrary to Apple's reports, Fast Electronics (415/802-0772) currently has no similar plans.

Other Needs

• **National Instruments** plans a summer release for four Macintosh PCI products for scientists and engineers: the PCI-GPIB instrument-control card, $495; the PCI-MIO-16XE-50 16-bit data-acquisition card, $1295; the PCI-1200 12-bit data-acquisition card, $795; and the low-cost PCI-DIO-96, $395. 512/794-0100.

• **Second Wave's** Xpanse PN series lets NuBus cards work with a PCI Power Mac. The Xpanse PN200 supports two NuBus cards and costs $595. The Xpanse PN400 holds four cards and costs $995. The Xpanse PN800 holds eight cards and costs $1895. 512/329-9283.—JIM FEELEY

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Power Mac 8500: Best Personal Computer for Multimedia Power Users

SPECIAL PREVIEW

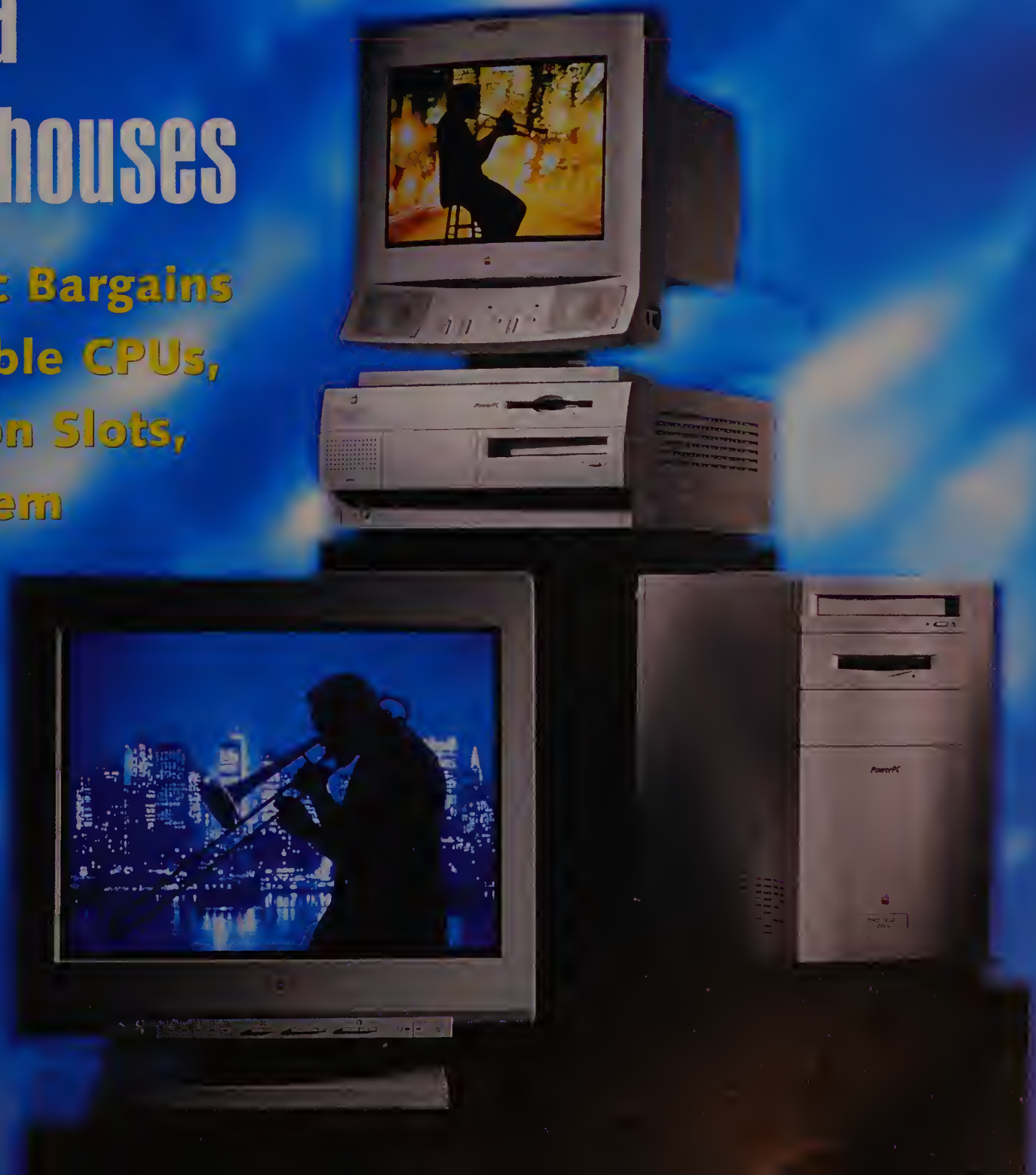
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IRST LAB TESTS

Multimedia PCI Powerhouses

nnovative Mac Bargains
oast Upgradable CPUs,
hree Expansion Slots,
nhanced System
oftware



PHOTOGRAPH BY PAUL FRANZ-MOORE
SCREEN IMAGES BY MITCHELL FUNK/IMAGE BANK

Giant Leaps The latest Power Macs sport powerful AV capabilities. The 8500 (top left) is the video producer's dream, while the 7200 and 7500 (the two share the same case design) offer telephony and AV options suited for business users.

Four fast, affordable Power Macs shine with hot new multimedia features

POWER MAC THE NEXT GENERATION

The first of the second-generation Power Macs—the PCI-based Power Mac 9500—offers sheer speed and expansion (see "First of a New Breed," *Macworld*, August 1995). But the real excitement and innovation come with the follow-on PCI Power Macs recently introduced at the Macworld Expo in Boston: the 7200, 7500, and 8500. Particularly innovative is the incorporation of better AV and telephony technology. And all three new Power Macs use the same revised Power Mac architecture as the 9500, including fast PCI expansion slots and enhanced system software. Plus, the 7500 and 8500 have an upgradable CPU, like the 9500.

First, there's the Power Mac 8500, with its upgradable 120MHz PowerPC 604 CPU—the same as in the 9500/120—and the best built-in multimedia features you'll find on any personal computer. Then there's the 7500, with its foolproof expansion design. And at the low end, there is the 7200, which boasts price/performance ratios that may depress owners of the Power Mac 8100/80.

These new machines are the mainstream second-generation Power Macs—the ones most of us will want on our desks. (You can also expect PCI Macs from Power Computing in September.) While the Power Mac 9500 is speedier than the newer models, it's a specialized system designed primarily with high-end expansion in mind.

Each new Power Mac includes three PCI slots, a quadruple-speed CD-ROM drive, and 8MB or 16MB of RAM. (The table "What the New Power Macs Offer" describes the differences among the PCI Power Macs.) The three newest machines also incorporate the key enhancements that debuted in the 9500: a faster 680X0 emulator, 10BaseT Ethernet connectors, more native Mac OS code, and a fast memory architecture that uses Dual In-line Memory Modules (DIMMs) instead of the Single In-line Memory Modules (SIMMs) that Macs have used until now. Prices, which were still being finalized at press time, range from $1600 for the basic Power Mac 7200 to $4000 for the basic Power Mac 8500.

All three new models offer a first for desktop Macs: a variety of energy-saving, PowerBook-like sleep modes. A new Energy Saver control panel lets you power down the monitor, spin down the hard drive, and put the CPU and/or the entire machine to sleep. The Mac springs back to life when you hit a key, move the mouse, or receive an incoming call. A sleeping 7200 uses less than 30 watts of electricity, making it meet the U.S. government's Energy Star power-saving requirements. The other models reduce their power consumption when asleep, but not to as little as 30w.

These features will make the computers more convenient in homes and small offices and help businesses cut energy costs. The sleep modes also make some telephony applications more practical—it's wasteful to leave a desktop computer on all the time just to answer phone calls or receive faxes, but a new Power Mac can stay asleep until a call actually comes in.

To make room for the new Power Macs, Apple has discontinued several of its older models: the Quadra 950, Quadra 630, Power Mac 8100, Power Mac 7100, and Power Mac 6100. (For at least the rest of 1995, the Performa and LC 640 and 630 remain available, as does

by Jim Heid

MW LAB

the Performa 6100 DOS Compatible.)

The names for Apple's new Macs may seem a bit confusing—why, for example, is the 7500 faster than the 8100, when a bigger number in a model name usually means "better"? In Apple's naming scheme, the first digit represents the series. In that scheme, a 9 means a big tower (like the Quadra 950, Power Mac 9500, or Workgroup Server 9150), an 8 means a minitower (like the 8100 and 8500), a 7 means a traditional desktop case (like the Power Mac 7100 or 7200), a 6 means a flatter desktop case (like the Power Mac 6100; earlier 6 models, like the Quadra 630 and Centris 650, are now part of the 7 series), and a 5 means an all-in-one design (like the Performa 5200).

Within a series, the larger the model's number, the more features it has; a number following the model number, after a slash, indicates the CPU speed. And the AV moniker has gone away—you just have to know which models include AV.

Built for Speed

The Power Mac 8500 is the connoisseur's second-generation Power Macintosh. It shares the 9500's PowerPC 604 CPU, although the 8500's is available only at 120MHz, not 132MHz. As in the 9500, the CPU resides on a plug-in expansion card. The 9500, 8500, and 7500 have identical CPU-upgrade slots, which will make trickle-down upgrades possible: for example, a 9500/120 or 8500/120 owner who purchases a 132MHz (or faster) CPU card will be able to pass the 120MHz CPU card along to someone who has a 7500. And as in the 9500, the 8500's internal bus speeds bump up when you install a faster CPU card, boosting video and SCSI performance.

Memory to Spare The 8500's motherboard—a two-sided design crammed with components, including 12 new, Apple-designed integrated circuits—contains eight DIMM memory sockets, which can accommodate up to 512MB of RAM using 64MB DIMMs, and a full 1GB using 128MB DIMMs. There's also 256K of cache memory. Like the Power Mac 9500, the 8500 provides an internal SCSI-2 Fast bus that can transfer up to 10MB per second. The 8500 will be available with a 1GB internal hard drive or with a 2GB drive; both configurations will include 16MB of RAM.

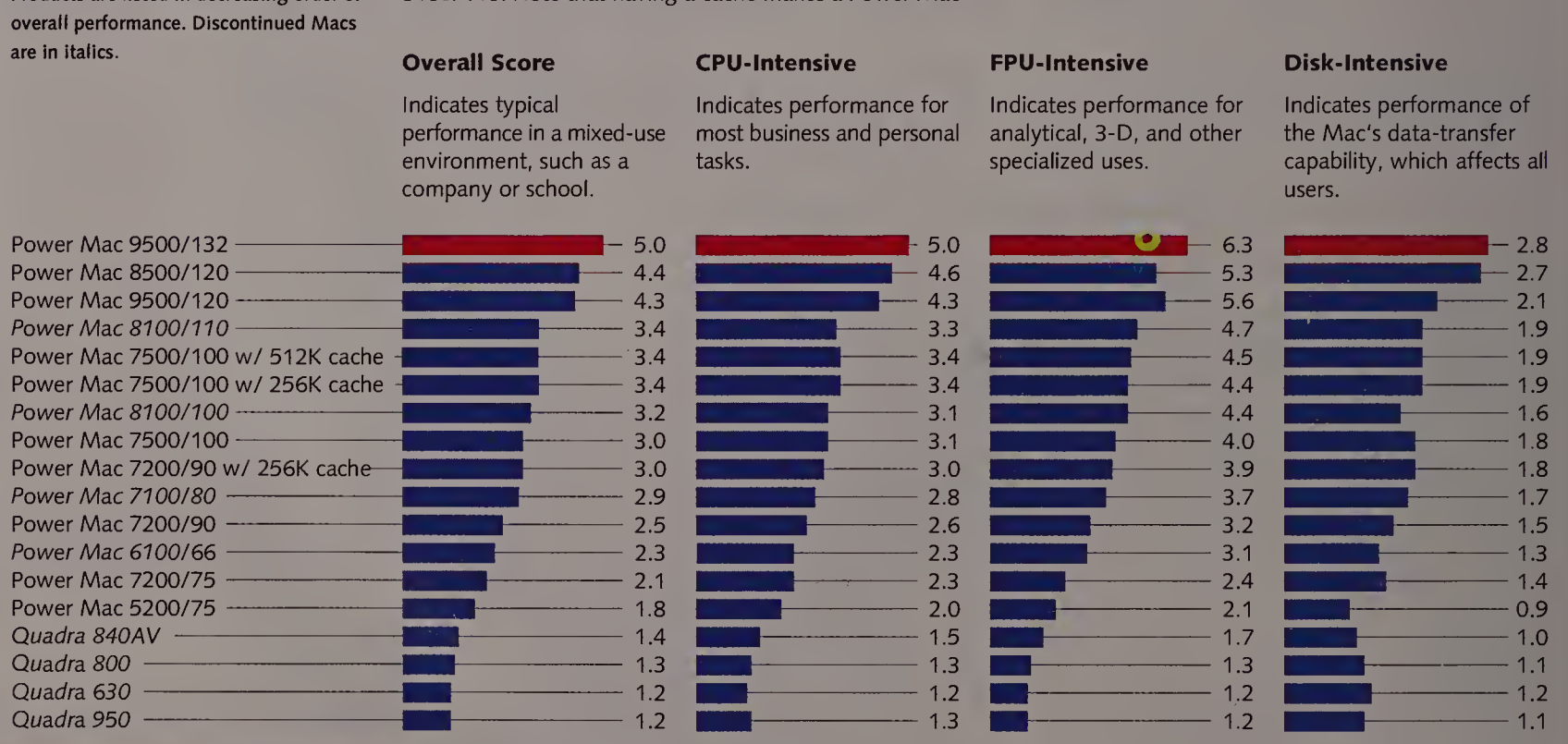
Upgrades from Other Towers The Power Mac 8500 uses the same minitower case as the Power Mac 8100, Quadra 840AV, and Quadra 800. On the downside, this means that upgrading RAM requires yanking out the motherboard. On the plus side, if you already own a minitower Macintosh, you'll be able to get a motherboard upgrade to turn it into an 8500. Apple estimates the upgrade will cost less than $2000 and will be available this fall. But keep in mind that your old SIMMs and NuBus cards won't work in the 8500, so factor in funds for RAM or specialized hardware.

MW LAB

How Fast Are the Latest PCI Power Macs?

= Best result in test.
Results are times as fast as a Centris 650 (Centris 650 = 1.0). Longer bars are better. Products are listed in decreasing order of overall performance. Discontinued Macs are in italics.

Apple's latest PCI Power Macs are plenty fast—the multimedia powerhouse 8500/120 is 1.3 times as fast as the speed demon of six months ago, the much costlier 8100/110. Note that having a cache makes a Power Mac faster (a cache is standard on all models tested except for the 7200 and 7500), but a bigger cache (512K versus 256K) offers no significant advantage.



BEHIND OUR TESTS

Macworld Lab tested several functions in eight key applications plus the Finder to determine real-world performance for the three critical performance areas faced by most users: the CPU-Intensive tasks evaluate the Mac's essential computing performance; the FPU-Intensive tasks gauge performance for operations that take advantage of the floating-point unit; and the Disk-Intensive tasks gauge the performance you'll get for launching programs, opening and closing files, and copying files.

We then averaged the results to determine the Overall Score, giving the CPU-Intensive score 60 percent of the weight and the FPU and disk scores 20 percent each.

These results are comparable with *Macworld* benchmarks published since the January 1995 issue. We tested native versions of software on the Power Macs and 680X0 versions on the 040 Macs. The software included System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.3. Our Power Macs had 24MB of RAM, while 680X0 Macs had 16MB. All systems were run with 8-bit color on 17-inch color monitors.—**Macworld Lab testing supervised by Mark Hurlow and Tim Warner**

8500: AV Made EZ

The Power Mac 8500's video-display, video-input, and video-output features are dramatic improvements over those of the earlier AV Power Macs and the pioneering Centris/Quadra 660AV and Quadra 840AV. The result is an ideal machine for multimedia production and an excellent foundation for high-end video work. And note that there is no non-AV 8500; the following features are standard equipment.

Sizzling Video Display Unlike the 9500, the 8500 includes on-board video circuitry—and how. A new, 64-bit video memory (VRAM) scheme makes for fast window redraws and sizzling scrolling. The machine includes 2MB of VRAM, expandable to 4MB using two 1MB VRAM SIMMs. Equipped with 4MB of VRAM, the 8500 can display millions of colors (24-bit video) on monitors with resolutions of up to 1152 by 870 pixels (the standard for a 21-inch monitor), and thousands of colors (16-bit video) at a resolution of 1280 by 1024 pixels—a resolution used for professional image retouching that no Mac's on-board video has provided until now.

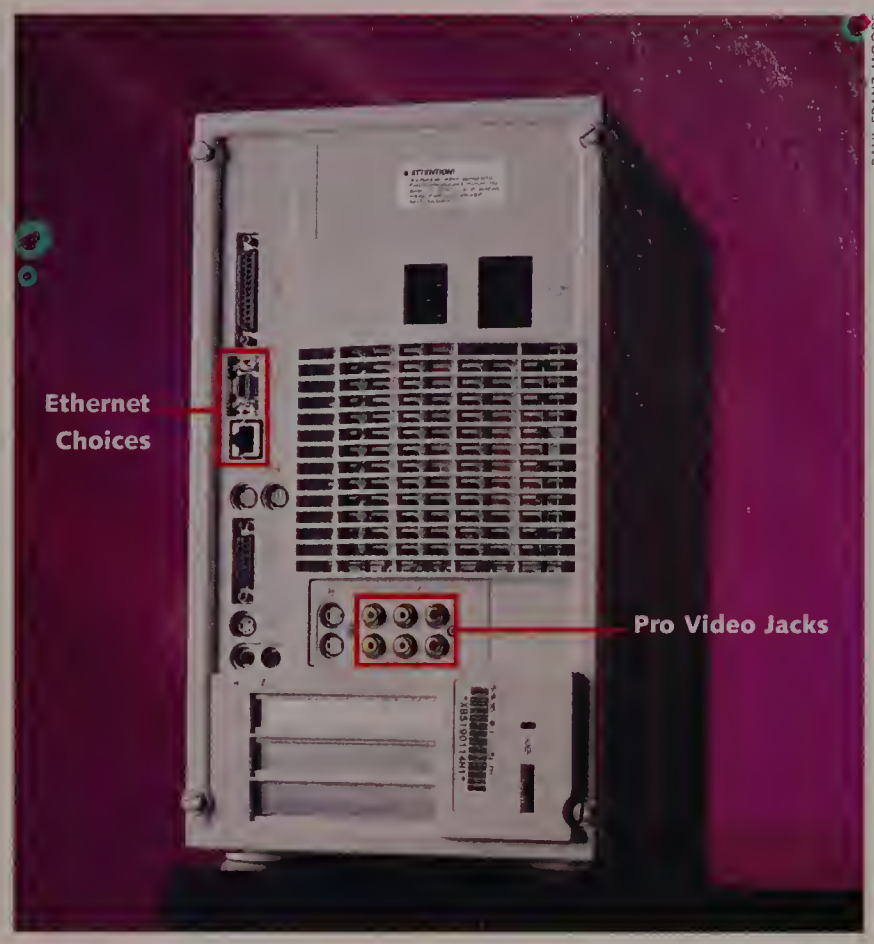
All this video horsepower terminates in a high-density monitor connector—the same kind of connector found on first-generation Power Macs. It also provides pass-through wires for the Apple Desktop Bus and for audio input and output, eliminating the spaghetti of cables when used with a monitor such as Apple's new AudioVision 17.

That high-density connector is the only monitor port that you will find: unlike first-generation Power Macs, none of the second-generation machines come equipped to drive two monitors. That saves Apple some cost by eliminating a feature that most users don't need. Equipped with 4MB of VRAM, however, the 8500 can simultaneously drive a monitor and a video device such as a TV monitor or camcorder.

Video Connections For getting video into the 8500, there are S-Video and composite-video input jacks (see the photo "Multimedia Options"). AV Power Macs, by comparison, lack composite inputs and rely on an easy-to-lose adapter cable to connect with composite gear.

The 8500's motherboard has a Digital Audio Video (DAV) connector that lets third-party cards tap directly into the machine's digitizer. Existing DAV cards such as Radius's SpigotPower AV won't work—the 8500's DAV slot isn't compatible with those of earlier AV Macs. Hopefully, companies such as Radius and RasterOps' Truevision subsidiary will be prompt in delivering on their promise to ship PCI-based digitizing boards.

The 8500's video-output capabilities are also dramatically better than those of previous Power Macs. The same basics apply: you can connect a video device—camcorder, VCR, TV monitor—and tape or display QuickTime movies, screen activity, or presentations. Beyond that, everything is new and improved. The 8500 can display 24-bit video on a video device; previous AV models were limited to 16-bit video, which caused color banding. At least as important, when you upgrade the 8500's VRAM to a full 4MB, you don't have to shut down the computer's monitor to send the screen image to a video device: instead, you can set up the 8500 to mirror its screen on both the monitor and the video device, or to treat the video device as a second monitor. With the stock 2MB of VRAM, the 8500 works similarly to previous AV Macs—when video-out is active, the monitor goes dark.



Multimedia Options The Power Mac 8500 adds to the usual bevy of Macintosh ports two significant sets of connectors. One set is Ethernet, for which there is one standard AAUI port (which requires a transceiver) and a 10BaseT port (for which the transceiver is built-in). The other set is video in/out, providing input and output connections for S-Video and composite-video devices.

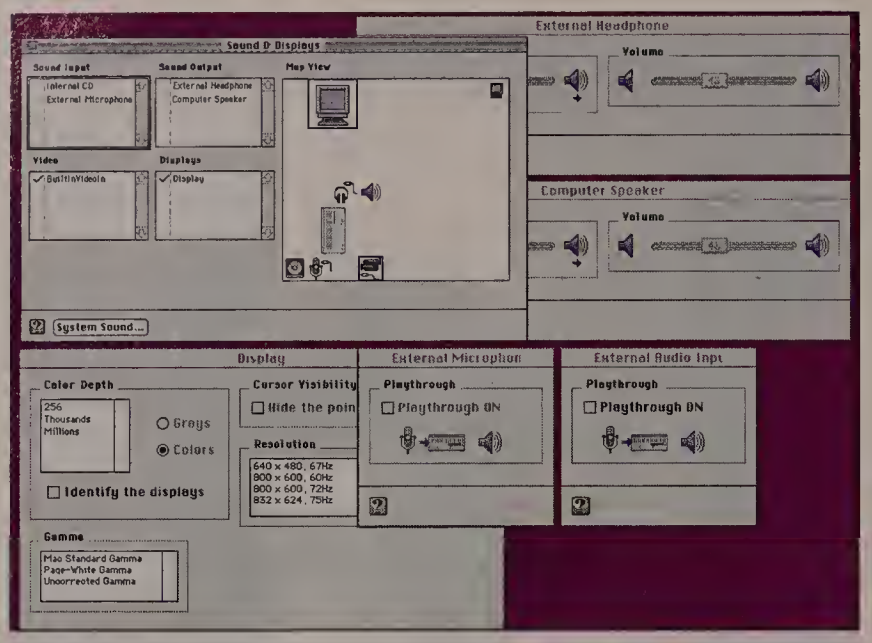
The 8500 also supports a hardware zoom feature that lets you fill the screen with a QuickTime movie whose actual dimensions are 320 by 240 pixels (quarter-screen resolution). QuickTime 2.0 supports a software-only full-screen playback mode, but it uses pixel doubling—it simply duplicates each horizontal and vertical pixel. The 8500's hardware zooming, by comparison, actually creates new pixels based on the movie's existing ones, a process called interpolation.

Fuller-Motion Video Like earlier AV Macs, the 8500 can display full-screen, 30-frames-per-second (fps) video using the included Apple Video Player program, which is similar to that supplied with the Quadra and Performa 630. You can also use Apple Video Player to digitize video, or use a program such as Adobe Premiere or Avid VideoShop—in fact, the full version of VideoShop 3.0.2 is bundled with the 8500.

At a press briefing for *Macworld* editors, Apple showed a stock 8500 capturing 30 fps at a quarter-screen movie size (320 by 240 pixels, a standard size for CD-ROM–based QuickTime movies). Previous AV Macs could muster only between 8 and 15 fps (see "Advanced AV Options," *Macworld*, August 1995). According to Apple, the movie quality is better, too.

Capture capabilities like these would seem to make the 8500 a natural for CD-ROM production. However, quality-obsessed CD producers sometimes capture movies at full-screen sizes and then use Adobe After Effects software to scale down to a quarter-screen size, since this tends to provide better image quality. These folks—as well as video producers who need full-screen, 60-*fields*-per-second captures—will need to add third-party hardware. Such hardware can cost as little as $1500.

Better Audio, Too In developing the 8500, Apple didn't neglect the *A* half of the AV equation, either. The 8500 sports audio line-input and -output jacks—the same kind of RCA phono jacks used in stereo equipment and on VCRs. This means that audiophiles need not use those cheesy ⅛-inch stereo miniplugs (although they are still provided on the 8500). There is a genuine audio-quality benefit to not using miniplugs: they are prone to cross talk (one channel's signal leaking into the other channel) and noise. Apple also says it fine-tuned the



Full Control The new Power Macs introduce a new Sound & Displays control panel, which integrates the previously separate control panels that manage sound in/out, monitor, and video in/out settings. A graphical mode, or Map View, lets you see iconically what kinds of devices are connected (such as video cameras, videotape decks, microphones, and monitors).

audio circuitry to provide cleaner sound than previous Macs offer.

Studio Software For controlling this audiovisual studio-in-a-box, there's a new control panel, named Sound & Displays (see the screen shot "Full Control"). Sound & Displays provides a graphical view of the machine's sound and video capabilities and simplifies the process of configuring monitors. It also improves on the Monitors control panel that it replaces; for example, you don't have to restart after dragging the menu bar from one monitor to another, and you can activate display mirroring by simply dragging one display's icon over another's. You can also control any video device that's attached to the Macintosh, for example, a camera.

One more software enhancement is a desktop version of the Control Strip that debuted on last year's PowerBook 500 series, with new modules that let you switch monitor settings without using the Sound & Displays control panel. The Control Strip is also included on the new Power Mac 7500.

Talk to Me Apple has bundled Cypress Research's MegaPhone software so you can set up the Mac to send and receive faxes and to receive voice mail—if you have a GeoPort Telecom Adapter. Often called a pod, this paperback-size device is not a modem, but an interface between the Mac and analog phone lines (it won't work with PBX phone systems). The GeoPort and Express Modem software essentially turn a Mac into a 14.4-Kbps modem. (Apple expects to ship a software upgrade that lets the new Power Macs run at the speed of a 28.8-Kbps modem later this year.)

7500: The Expandable Middle Class

The Power Mac 7500 represents the midrange in the lineup, providing many of the most innovative features of the second generation at a reasonable price of $2800 for the basic unit.

As mentioned earlier, the 7500's 100MHz PowerPC 601 chip resides on the same type of upgradable CPU card used by the 8500 and 9500. (Indeed, the 7500 is built to accommodate up to a 150MHz PowerPC 604.) The eight DIMM slots house up to 512MB of RAM. Another slot can accommodate a cache card, which is not included. Cache cards generally increase performance by 10 to 20 percent. Note that the new Macs' cache card is not compatible with the Power Mac 6100, 7100, or 8100.

The 7500's on-board video subsystem is identical to that of the 8500: the motherboard's 2MB of VRAM is expandable to 4MB, and monitor support and resolutions are the same. Apple offers a choice of 500MB and 1GB hard drives.

Easy Upgrading Adding memory upgrades to the 7500 is a cinch. Flick two plastic latches to remove the top of the case—no screws. Inside, the storage devices and power supply are mounted on a hinged chassis that swings up to allow complete access to the motherboard beneath (see the photo "Built for Upgrades"). The case also has an additional bay that accommodates a 3½-inch device, such as a second internal hard drive. Another nice touch is an easily removed baffle over the expansion slots that protects any PCI cards while you're upgrading other components.

Apple designed the new case not only to simplify upgrading, but because the 7100-style case—which originally housed 1992's Mac IIvx and IIvi—was not able to adequately absorb the radio interference generated by the fast CPUs the new models use. The downside is that no upgrade to the 7500 will be available for the Power Mac 7100 or earlier Macs using the same case (the IIvi, IIvx, Centris 650, and Quadra 650). The move is understandable, but Apple can still expect some complaints from customers who recently bought 7100's and now find themselves unable to upgrade to the second generation. After all, Apple had indicated for several years that it would ensure basic case designs wouldn't change enough to prevent future upgrades.

Power Mac 6100 owners are also likely to squawk, since their Mac has been discontinued and there is no similarly designed new Mac to upgrade to. Apple has released the Power Mac 6200 in Europe, and said a Performa 6200 is planned for the U.S. market later this year. The company may support an upgrade from a 6100 or 610.

Videoconferencing, Not Video Editing The 7500 lacks the 8500's video-out ports and print-to-video features, but it does provide identical video-input features: S-Video and composite-video input jacks; full-screen, full-motion video playthrough; and QuickTime movie captures (30 fps at quarter-screen sizes, according to Apple). It also provides the RCA jacks for audio in and out, and a DAV slot on the motherboard.

Why leave out the video-out? Because Apple is positioning the 7500 as a business-oriented Mac whose video features are ideal for videoconferencing—the 7500 includes Apple's QuickTime Conferencing software. This sensible

What the New Power Macs Offer

System	Apple's Estimated Price [A]	CPU	CPU-Upgrade Slot	Cache Card	PCI Slots
Power Mac 9500/132	$5800	132MHz 604	yes	512K included	6
Power Mac 9500/120	$5000	120MHz 604	yes	512K included	6
Power Mac 8500/120	$4000	120MHz 604	yes	256K included	3
Power Mac 7500/100	$2800	100MHz 601	yes	optional	3
Power Mac 7200/90	$2100	90MHz 601	no	optional	3
Power Mac 7200/75	$1600	75MHz 601	no	optional	3

[A] For base models. [B] Requires third-party video card. [C] 4MB of VRAM supports 24-bit color at 1152-by-870-pixel resolution; 832-by-624-pixel resolution.

strategy reduces the machine's cost without gutting its multimedia capabilities. (CD-ROM producers and QuickTime tinkerers generally don't need video-out features, and if they do, third-party video-out hardware is relatively inexpensive.) And if videoconferencing ever does take off, the 7500 is ready for it—once you buy a video camera.

In the meantime, Macworld Lab's speed tests indicate that the 7500 can handle just about anything else.

7200: Not-So-Low End

Redefining the low end of the Power Mac line is the Power Mac 7200, available in 75MHz and 90MHz speeds. Yes, the new low-end Power Mac has CPU speeds that approach or exceed those of the original high-end Power Mac, the 8100/80.

The 7200 uses the 7500's new case design and will be upgradable to a 7500 via motherboard swaps that Apple expects to make available in mid to late 1996. There is no CPU-upgrade slot, so a motherboard swap is the only way to increase the 7200's speed.

With its three PCI slots, the 7200 provides a degree of expandability that previous entry-level business Macs—the Power Mac 6100 and Quadra 630, now discontinued—never could.

To arrive at the 7200's price of $1600 (75MHz) and $2100 (90MHz), Apple had to omit some features that the 7500 and costlier Macs provide. First to go was the CPU upgrade slot. Other omissions include the high-density AV connector (the low-end machines have a standard DB-15 monitor connector); RCA audio ins and outs (the low-end machines still have miniplugs); and the microphone that comes with the 8500 and 7500.

The 7200 accepts less RAM than the 7500 or 8500: its four DIMM slots allow for up to 256MB of RAM with 64MB DIMMs. The cache and RAM buses are 64 bits wide, as opposed to the faster 128-bit buses in the 7500, 8500, and 9500. As with the 7500, no cache is included, although you can add one.



PAUL FRANZ-MOORE

Built for Upgrades The new case design for the Power Mac 7200 and 7500 lets you swing out the power supply and slot-bay covers so you can easily add memory and cards.

The two 7200 models have similar on-board video features, although the 7200/90 goes a bit further than the 7200/75. Both include 1MB of video RAM; the 7200/75 can be upgraded to 2MB (allowing for 24-bit color on 16-inch monitors), while the 7200/90 supports up to 4MB. In their stock configurations, the machines use a 32-bit-wide graphics bus; when upgraded, the VRAM DIMMs interleave to 64 bits wide. Hard drive options are the same as for the 7500: 500MB and 1GB.

The Last Word

The latest Power Macs take the basic architectural advances developed for the 9500 and combine them with features aimed at typical users' needs. The 8500 is clearly the choice for color publishers, multimedia producers, and engineers—the 9500 may be faster, but it requires you to add several third-party cards to get what the 8500 has built in. The 7500 is clearly the power user's desktop Mac, with enough audiovisual and telephony technology to let you dabble in videoconferencing, voice mail, and motion-video capture. The 7200 is the Mac that most of us will buy, since it provides great performance without all the bells and whistles that inflate the 7500's price.

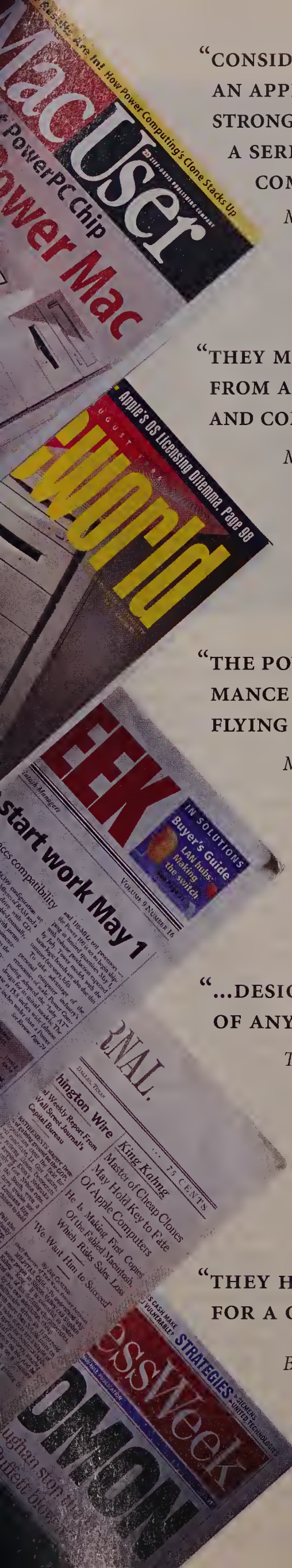
But keep in mind that with slower memory architecture and no upgradable processor, the 7200 also offers less room to grow than the 7500. If you anticipate needing more speed in the near future (and who doesn't?) or wanting to dabble with digital video, you might consider spending the extra money for the 7500.

With the 7200, 7500, and 8500, the Power Mac line is no longer hamstrung by circa-1987 limitations such as SIMMs and NuBus slots. Better still, Apple has crafted a product line whose members have not only strong common denominators—three PCI slots and great performance—but also have important differences that address the needs of specific types of users. And best of all, the leading-edge technology they offer is surprisingly affordable. **m**

IMM ots	VRAM (Base/Maximum)	AV Features	Telephony Features
2	none/none [B]	16-bit stereo in/out	GeoPort
2	2MB/4MB [B, C]	16-bit stereo in/out	GeoPort
3	2MB/4MB [C]	16-bit stereo in/out, RCA jacks, 24-bit video in/out [D], DAV slot	GeoPort, fax/modem/voice mail software, QuickTime Conferencing
3	2MB/4MB [C]	16-bit stereo in/out, RCA jacks, 24-bit video in [D], DAV slot	GeoPort, fax/modem/voice mail software, QuickTime Conferencing
4	1MB/4MB [E]	16-bit stereo in/out	GeoPort, fax/modem/voice mail software
4	1MB/2MB [E]	16-bit stereo in/out	GeoPort, fax/modem/voice mail software

id 16-bit color at 1280-by-1024-pixel resolution. [D] S-Video and composite video. [E] 2MB of VRAM supports 24-bit color at

Contributing editor JIM HEID wishes he'd had a Power Mac 8500 when producing the CD-ROM for his *Macworld Complete Mac Handbook,* fourth edition (IDG Books Worldwide, 1995).



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Macworld – Aug '95 MW ★★★★

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MacWeek – April '95 ♦♦♦♦

"...DESIGNED TO WARM THE HEART OF ANY MAC FANATIC."

The Wall Street Journal – 18 May '95

"THEY HAVE THE REAL POTENTIAL FOR A CINDERALLA STORY!"

BusinessWeek – May '95

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Power Mac News

Tantalizing Potential of Four CPUs

APPLE, DAYSTAR SET NEW STANDARD FOR FAST MACS

The Macintosh is finally breaking into a key technology for those who need maximum speed: the use of two or more PowerPC processors in a single computer to accelerate compute-intensive tasks dramatically.

The recently announced collaboration of Apple and DayStar Digital will initially produce multiprocessor technology for DayStar Genesis MP publishing clones, but it should extend to other Mac system makers over time.

Ideally, two-processor systems run properly coded applications twice as fast as single-processor systems with the same CPU; three-processor systems, three times as fast; and so on. This *symmetrical multiprocessing*, in which system and application tasks are distributed across the available processors, was once the province of specialty workstation vendors. It's now offered by mainstream vendors such as Compaq—though primarily to speed up transactions with massive databases on Windows NT– and OS/2-based servers.

PowerPC processors are also well suited to symmetrical multiprocessing. Unfortunately, the Mac OS won't support symmetrical multiprocessing until sometime in 1997—two OS generations from now. The Mac OS allows only *asymmetrical multiprocessing*, in which operating-system tasks must always be performed on one processor, while other tasks can be allocated partly to this main processor and partly to extra processors.



DayStar and Apple have developed an Application Program Interface (API) that modifies application software to take advantage of multiprocessing technology. Recent Macworld Lab tests of a prototype DayStar system show how well multiprocessing can work, particularly on large files. In applying Photoshop filters to a 10MB image, the Genesis MP system operated twice as fast as an otherwise identical single-processor system; with a 20MB image, the Genesis MP raced ahead at 2.8 times as fast.

Early users of the Apple-DayStar API include Adobe (mainly for Photoshop), Elastic Reality (for morphing and related virtual reality applications), and Strata (for StudioPro, Strata's 3-D design and animation program). DayStar expects to offer the Genesis MP system by late summer; the above software vendors should have multiprocessor-aware applications around the same time.

The forthcoming CodeWarrior7 from Metrowerks (514/747-5999) includes a multiprocessing library that should open the door to faster database processing, and keep Mac performance on publishing applications as good as or better than anything possible on any other PC for the foreseeable future.—CHARLES SEITER

Power Watch

THE LATEST ON PRODUCTS FOR THE POWER MAC

A newly native MapInfo 3.0.4 is now shipping for $1295. Users can upgrade from any previous version for $299. (518/285-6000).

• Optronics (508/256-4511) is offering a native PostScript Level 2 interpreter for the DeskSetter 3000 and DeskSetter Express imagesetters. Current users can upgrade to the new software RIP for $3500.

• PowerFPU 1.0, the $99 native version of SoftwareFPU from John Neil & Associates (415/905-3000), is now shipping. Upgrades cost $50 from SoftwareFPU.

• White Pine Software (603/886-9051) has released native versions of its terminal-emulation packages, Mac320, Mac320 Lite, and Mac340. Users can upgrade from version 1.3 for $25 for Mac320 Lite, $45 for Mac320, and $75 for Mac340; regular pricing is $99, $199, and $349, respectively.

• Software Ventures (510/644-3232) has released MicroPhone Pro for Power Macintosh 2.1.1.

—SUZANNE COURTEAU

MW LAB What Multiprocessing Can Deliver on the Mac

Tests on a prerelease version of the DayStar Genesis MP multiprocessor Mac show what multiprocessor technology can offer. In going from a single-CPU system to a four-CPU system, Macworld Lab found average speedup of 2.6 times, and a range of speedups from 1.6 to 3.5 times. In no operation did the four-CPU system perform 4 times as fast as the single-CPU system. There are two main reasons we don't get four-times speedups: one is that a certain amount of overhead goes to coordinating CPUs; the other is that few operations can be divided into four equal parts that can be executed simultaneously. Shown here are several operations that demonstrate different speedup amounts.

Shorter bars are better. Results are in seconds.

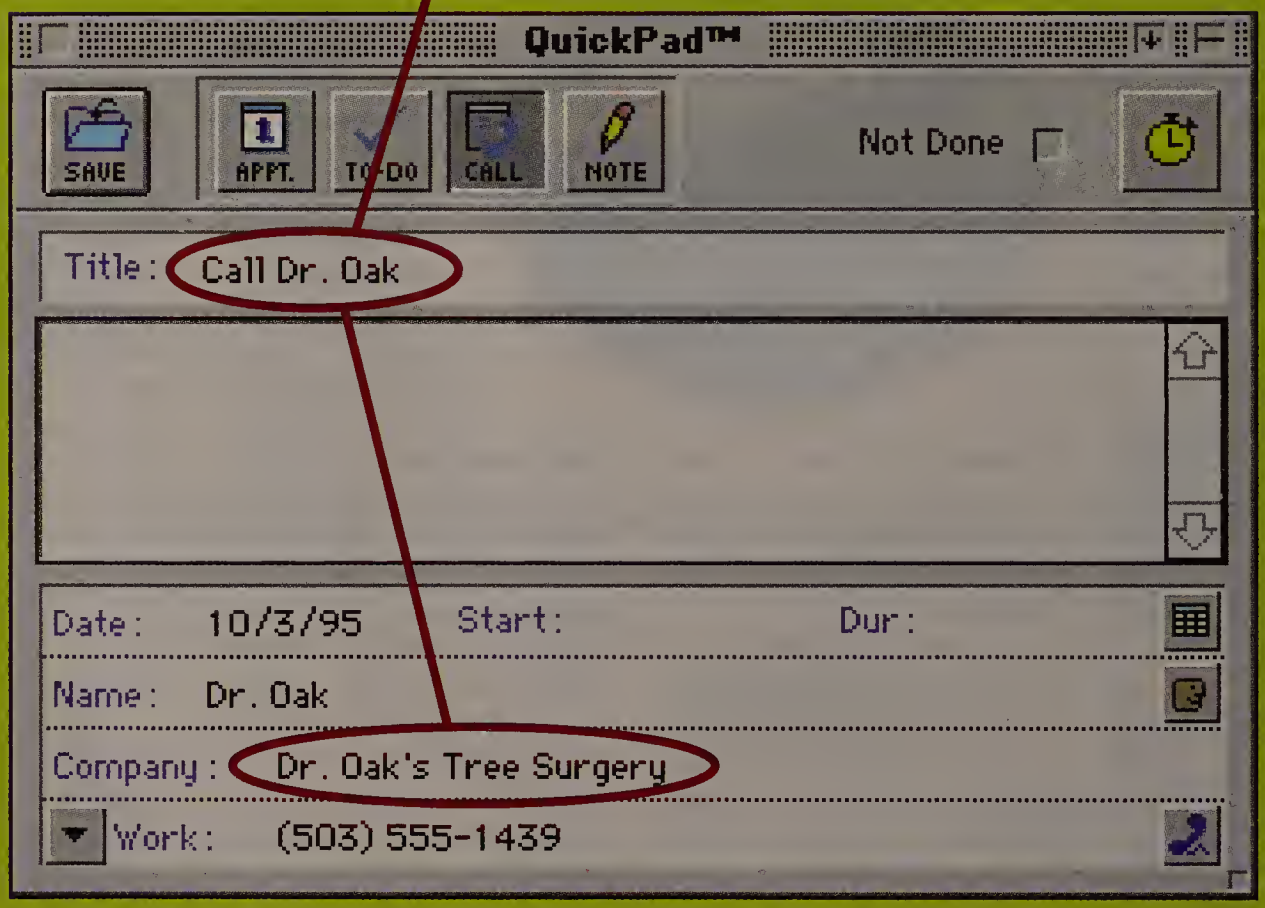
	Mode Change	Unsharp Mask	Sharpen	Sharpen More	Blur	Blur More	Motion Blur	Emboss	Despeckle
One CPU	15.2	31.7	3.9	4.8	3.3	5.2	89.1	11.4	18.2
Four CPUs	4.4	11.9	1.8	1.5	2.1	2.2	46.2	3.8	6.6

BEHIND OUR TESTS Macworld Lab conducted its tests on a DayStar Genesis MP (a PCI-based Power Mac) with 64MB of RAM, a 4GB internal drive, and a 17-inch monitor driven in 24-bit mode by an ATI Xclaim GA video card. We used a 10MB test image and an early prerelease version of Photoshop 3.0.1 modified for multiprocessor use. We allocated 50MB of RAM to Photoshop. We tested operations with one 100MHz PowerPC 601 CPU and with four. The shipping Genesis MP systems will use PowerPC 604 CPUs.—**Macworld Lab testing supervised by Danny Lee**

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Circle 38 on reader service card

Macworld Online

by Macworld Online Staff

Macworld Web Launch

With a great deal of relief and anticipation, Macworld Online announces the launch of our World Wide Web site at **http://www.macworld.com.**

In the spirit of the magazine, Macworld Online is committed to quality and service for our readers. Besides offering electronic access to a full year's worth of *Macworld* editorial, we also provide a slew of exclusive articles and files aimed at the savvy Mac cybernaut. Knitting all this information together are linking, searching, and interactive technologies.

Links to the World

Besides giving you the ability to view graphics and multimedia over the Internet, the Web introduces the marvel of linking. Simply click on a highlighted word or phrase—say, "modem FAQ" (frequently asked questions file)—and you might find yourself reading a document that resides on a server in Sweden or Australia.

Macworld Online constantly culls from the Web universe, links we think will be valuable to our readers, including those links from software and hardware developers wishing to provide in-depth information and easier access to tech support.

Successful Searching

All the data in the world would be useless if you couldn't find anything, so we've spent many hours refining our search functions. On the Macworld Online Web server, if you type the name of a product or category—fax modems, for instance—in our search box, you jump to a page that lists *Macworld*'s most recent comparative overview of fax modems, any single-product reviews in the past year, and links to fax-modem tips that appear in columns such as *Quick Tips* and *PowerBook Notes*, plus a selection of communications shareware utilities you can download from our software library. You'll also find a selection of online-only articles on the subject.

Two-Way Communication

Macworld receives fewer letters than you might suppose. Without day-to-day feedback from readers, magazine publishing can become an ivory-tower exercise, so on our commercial online-service forums and now on our Web server, *Macworld* is pleased to host message boards that encourage suggestions, critiques, and exchanges among readers.

Macworld Online's interactive content already includes animated informational graphics, audio files, and games. Watch for the regular upload of new multimedia files, as well as a series of contests, polls, and collaborative documents. Hook yourself up to the Web and check us out—we're looking forward to seeing you.

LIVE-EVENTS CALENDAR

Plug into Macworld Live for our weekly real-time events that feature some of the brightest stars in the Macintosh universe. We bring editors and writers, artists and visionaries directly to your desktop. It's a great place to spend an hour learning about your Mac and discussing pertinent issues with other Macintosh users. AOL events are on Thursdays, and eWorld events are on Wednesdays. All events are at 6 p.m. Pacific standard time.

Ask Cary Lu
August 2, eWorld
Contributing editor Cary Lu's *PowerBook Notes* column is the last word in mobile computing, but he can also answer questions on just about every Mac ever made.

Macworld Expo Preview
August 3, AOL
Macworld editor-in-chief Adrian Mello has 11 years of Macintosh experience and plenty of computing savvy. This evening, Adrian offers a sneak preview of the Boston Macworld Expo.

Live from Macworld Expo
August 10, AOL
Macworld Online's live report from Macworld Expo in Boston. Tune in for the lowdown from Beantown. We promise surprises.

Costa's Clinic
August 16, eWorld
Join Macworld Online's own Steve Costa for a walk-in Mac clinic. Steve will help you tune up your computer, choose great shareware, and give you the scoop on all things Macintosh.

Passage to Vietnam
August 17, AOL
Among today's CD-ROM developers, Against All Odds Productions clearly stands out. The company's latest offering is Passage to Vietnam, a hauntingly beautiful work that combines music, photographs, and video. Come learn how they did it.

Getting onto the Internet
August 24, AOL
Macworld editors Cameron Crotty and Joanna Pearlstein offer their insights into the tangled jungle called the Internet. Come prepared for an evening of Net bushwhacking tips, connection secrets, and navigation tricks.

Jim Heid Q&A
August 31, AOL
At his regular monthly event, *Macworld* contributing editor Jim Heid shares his favorite tips and tricks and gives you his opinions on the latest Mac technology.

Best of the Web

The Postcard Store is a charming Web site. Pick an electronic card from the many delightful choices and E-mail it to a friend. **http://postcards.www.media.mit.edu/Postcards**

Internet Tools Summary provides a robust compendium of Web helper applications and online utilities. **http://www.rpi.edu/Internet/Guides/decemj/itools/toc3.html**

The Star Trek: Voyager site is well worth the visit, even if you aren't a dyed-in-the-Talaxian-wool Trekker. **http://voyager.paramount.com/VoyagerIntro.html**

The Internet Movie Database is a remarkable collaborative document that invites your perusal and input. **http://www.cm.cf.ac.uk/Movies/moviequery.html**

San Francisco's Exploratorium, a hands-on science museum, demystifies technology; this Web site, dubbed ExploraNet, complements the museum's efforts well. **http://www.exploratorium.edu**

CyberWire Dispatches are Brock Meeks's insightful bulletins covering everything from online-related legislation to industry and technology updates. **http://cyberwerks.com:70/1s/cyberwire/cwd**

REACHING MACWORLD ONLINE

America Online and eWorld
Keyword is Macworld
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URL is
http://www.macworld.com

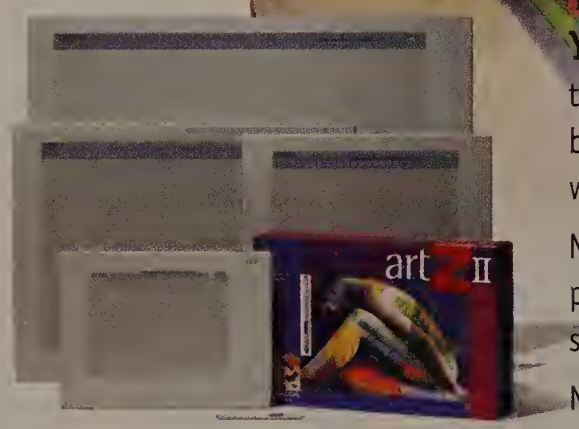
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Artwork created by Phillip Howe of Seattle, WA on a Wacom ArtZ II 12 x 12 graphics tablet using Adobe Photoshop 3.0 and Fractal Design Painter 3.1

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Circle 146 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

by Jim Feeley
and Joanna Pearlstein

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY *MACWORLD*. UNLESS OTHERWISE STATED, ALL PRICES ARE SUGGESTED RETAIL AND THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS WITH 1MB OF RAM, RUNNING SYSTEM 6. A ◀ SIGNIFIES THAT A NATIVE POWER MAC VERSION OF THE PRODUCT IS AVAILABLE. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY *MACWORLD*. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

CD-R 1002

Smart and Friendly combines its double-speed recordable CD drive with Astarte's Toast CD-ROM Pro 2.5 recording software, selling the whole package for just under $2000. Toast supports audio CDs and most CD-ROM formats. The CD-R 1002 costs $1999 with Toast and $2599 when Macromedia Director and a limited version of Authorware are added to the ensemble. Smart and Friendly, 818/994-8001; fax 818/988-6581.

Elite XL 408 and Elite XL 1208

High-resolution 11-by-17-inch laser printers no longer cost as much as a small car. GCC Technologies' Elite XL 408 outputs 600 by 600 dpi on letter-size paper and 400 by 400 dpi on tabloid or A3 sizes. It ships with 4MB of RAM and 35 fonts; adding a standard 2MB SIMM enables the 408 to print 600 by 600 dpi on tabloid and A3 sizes. The Elite XL 1208 offers true 1200-by-1200-dpi tabloid or A3 output. It comes with 35 resident fonts, a CD-ROM with 250 more fonts, and a SCSI port. The printer integrates GCC's AccuGray technology, which improves halftone output. Elite XL 408 $1999, Elite XL 1208 $3999. GCC Technologies, 617/275-5800, 800/422-7777; fax 617/275-1115.

ImagiProof

Built around Minolta's new dye-sublimation engine, the ImagiProof produces



ImagiProof

300-dpi continuous-tone color output with registration accurate to 0.85 microns. According to the company, life expectancy for the thermal head is three times that of conventional dye-sublimation printers. The printer ships with built-in Ethernet, a 170MB hard drive, and 48MB of RAM (expandable to 192MB with standard SIMMs). ArriSystems offers a choice of DayStar Digital's ColorMatch or Agfa's FotoFlow color-management software. $15,995. ArriSystems, 408/457-4544; fax 408/727-7068.



Impression Maker

Impression Maker

Leave a shining impression by adding metallic-foil type and logos to your presentations, reports, and certificates. This foil imprinter lets you create personalized covers integrating one of General Binding's six foil colors. It comes with 14- to 30-point Times Roman and Arial type-impression wheels, with more type styles planned, and supports graphic logos up to 2 by 1½ inches. Impression Maker accepts materials up to 12⅜ inches long and 3/16 inch thick. $4400. General Binding, 708/272-3700, 800/723-4000; fax 708/272-7087.

Joule PC Reader/Writer

This paperback-size SCSI device lets desktop Macs read and write to PC Cards (formerly PCMCIA cards), giving desktop machines the same advantage as their PowerBook 500 laptop cousins that are equipped with PC Card adapters. Using this device, the Mac views any PC Card 2.1–compliant hard drive, fax modem, networking interface, or solid-state storage device as a standard SCSI device. Joule PC Reader/Writer offers transfer rates of up to 4MB per second. Available as a Joule Base for $589, a Joule Portable for $549, or a Joule Module for $549. La Cie, 503/520-9000, 800/999-1488; fax 503/520-9100.

PanaMedia 15 and PanaMedia 17

Panasonic fits two forward-facing speakers and a microphone into its PanaMedia monitors while increasing the width of the cabinet by only ¼ inch. Both the 15-inch and 17-inch models offer maximum Mac resolutions of 1024 by 768 pixels, 0.27mm dot pitch, push-button controls, and an on-screen adjustment menu. PanaMedia 15 $599, PanaMedia 17 $999. Panasonic Communications & Systems, 201/348-7000, 800/742-8086; no fax.

Scan-One Kit

The Scan-One Kit offers all the tools you'll need to integrate bar-code printing and reading into an existing database or accounting package. It includes Bar-One software for designing and printing labels, a Scan-One wand and software for reading bar codes, documentation, and an instructional video. The Scan-One Basic Kit costs $319. The Scan-One Professional Kit includes more-advanced software and sells for $429. Vertical Technologies, 801/576-9700, 800/477-5589; fax 801/576-5538.

StudioScan IIsi

Agfa's low-cost StudioScan IIsi color flatbed scanner runs up to five times as fast as Agfa's previous flatbed scanners yet offers better image quality and more bundled software. The StudioScan IIsi, aimed at small offices, design studios, and multimedia producers, has an optical resolution of 400 by 800 dpi. It provides a 2.4 D dynamic range and generates a full-color preview in 17 seconds. The scanner bundles Agfa's FotoLook 2.0 driver, FotoSnap automated scanning software, and FotoFlavor color-correction software, plus Adobe Photoshop LE and Caere OmniPage Direct OCR software. $995 company's estimated price. Agfa, 508/658-5600, 800/424-8973; fax 508/658-6285.



StudioScan IIsi

VIP Scan

You know that pile of business cards you've been planning to type into a Mac contact manager as soon as you find a spare month? The speedy, pocket dictionary–size VIP Scan is optimized for reading business-card layouts. This SCSI scanner is built around an OCR engine that intelligently places contact information in the appropriate database fields, and is bundled with Now Contact. $199. La Cie, 503/520-9000, 800/999-1488; fax 503/520-9100.

SOFTWARE

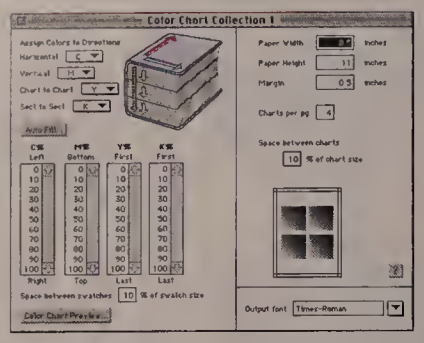
◀ Astound 2.0 for the Macintosh

Amaze your audience with the miracle of multimedia. Version 2.0 of this presentation software provides authoring capabilities, additional special effects, built-in animation capabilities, and support for both video and sound. Features include a slide sorter, outline view, speaker's notes, drawing tools, and a collection of templates. The package comes with a CD-ROM containing a variety of clip media, and you can also import your own PICT, GIF, TIFF, EPS, PCX, and Photo CD files. $249.95. Gold Disk, 408/982-0200, 800/982-9888; fax 408/982-0298, **catherinew@golddisk.com**.

[CMYK] Squared

Eti Software's solution to the color-management problem relies on creating color swatches for your output device. [CMYK] Squared generates CMYK process-tint charts in increments ranging from 1 to 100 percent. You define the CMYK percentages and swatch size, and the application creates a chart collection based on those specifications. Requires 4MB of RAM, System 7; 16- or 24-bit color monitor recommended. $119. Eti Software, 216/241-1140, fax 216/736-8868; **dev@implicit.com**.

continues



[CMYK] Squared

Epilogue 2.0

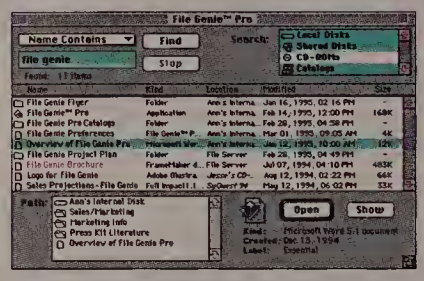
This Adobe Photoshop plug-in module enables users to produce raster-image and encapsulated PostScript (EPS) files within Photoshop, and according to Total Integration the new version is four times as fast as version 1.5. It supports preseparated and multipage PostScript files, as well as automatic antialiasing and online PostScript editing. Users can preview, crop, and select an area of a file to interpret. Requires Mac SE, 24MB of RAM, 120MB of free disk space, System 7, Adobe Photoshop 2.0 or Live Picture 2.0. $895. Total Integration, 708/776-2377, fax 708/776-2378.

ExecuTable 1.0

If setting tabs for tables in Adobe PageMaker has your wrists hurting and your hair turning gray, this product may be for you. No, it won't cure RSI or give you a good dye job, but this plug-in does automate the process of formatting tables in PageMaker. ExecuTable automatically calculates columns and gutters, and it supports predefined straddle heads and automatic text wrap. Requires Mac II, System 7, PageMaker 5.0. $239. ExecuStaff, 408/559-8400, 800/559-8490; fax 408/559-8525.

File Genie Pro

This utility for removable media maintains a catalog of every optical disk, SyQuest cartridge, CD-ROM, or floppy disk you insert in your Mac. In a matter of seconds, File Genie Pro can find any file on a disk by searching hard disks, network servers, and catalogs. Then it can either display the file's contents or open the creating application. If the file resides on an unmounted disk, File Genie Pro tells you which disk to mount. Requires System 7. Single user $89; five-user pack $349; ten-user pack $599. Duet Development, 408/559-3838, 800/383-8546; fax 408/559-7117; **duetline@aol.com**.



File Genie Pro

FreeMail Parent, FreeMail Call Home, and FreeMail Extended Family

An E-mail package that requires no computer network? FreeMail says it can be done. Relying on the *E.T.* "phone home" metaphor, FreeMail lets a group of users exchange E-mail via the FreeMail "parent." "Children" can send mail to the parent but not to other children. FreeMail Extended Family is a more full-featured E-mail product that lets children send mail to each other. Finally, FreeMail Call Home lets you access mail from remote destinations. Requires 68030-based Macintosh, 4MB of RAM, modem, System 7. FreeMail Parent $74.95; FreeMail Call Home $159.95; FreeMail Extended Family $59.95. FreeMail, 406/586-4200; fax 406/586-4336; **freemail@aol.com**.

Imaxis 2.01

You can move your office toward a paperless state with Imaxis, a client-server document-management system. Users can scan documents and run them through Imaxis's optical character recognition software. Then they can search full text, perform catalog searches, and place bookmarks on frequently accessed pages. A key feature of version 2.01 is improved document-retrieval performance. $3995 (includes scanning software, OCR software, server software, and four packages of the client software); Imaxis Start Up Pack $995 (contains scanning software, server software, and one client). Systems Engineering Solutions Inc., 703/573-4366, 800/462-9470; fax 703/207-9146; **imaxis@sesi.com**.

Internet Valet

Here's yet another product that promises easy Internet access. Internet Valet includes a copy of MacTCP and a free 14-day account with an Internet service provider. The product also comes with several Internet clients, including Eudora, a popular E-mail client; Fetch for retrieving files from FTP sites; NewsWatcher for reading Usenet newsgroups; TurboGopher for accessing Gopher sites; MicroPhone Telnet for remote log-on; and Enhanced Mosaic for browsing the World Wide Web. Requires 2MB of RAM, System 7; 14.4-Kbps modem or TCP/IP network connection recommended. $49.95. Software Ventures, 510/644-3232; fax 510/848-0885; **valet-info@svcdudes.com**; **http://www.svcdudes.com**.

Minitab for the Macintosh, Release 10 Xtra

In its first update since 1991, the statistics program Minitab sports a revised interface, additional statistics functions, and improved graphics capabilities. The new version has more than 200 tools for statistical analysis, including Shewhart control charts, Weibull and normal probability plots, cause-and-effect diagrams, and Pareto charts. The product also supports factor-analysis, multivariate analysis, and cluster-analysis techniques. It can import and export files from Microsoft Excel, Microsoft FoxPro, and Lotus 1-2-3. Requires 68020-based Macintosh with a math coprocessor, 8MB of RAM, System 7. $895 for commercial users; $495 for academic customers. Minitab, 814/238-3280, 800/448-3555; fax 814/238-4383.

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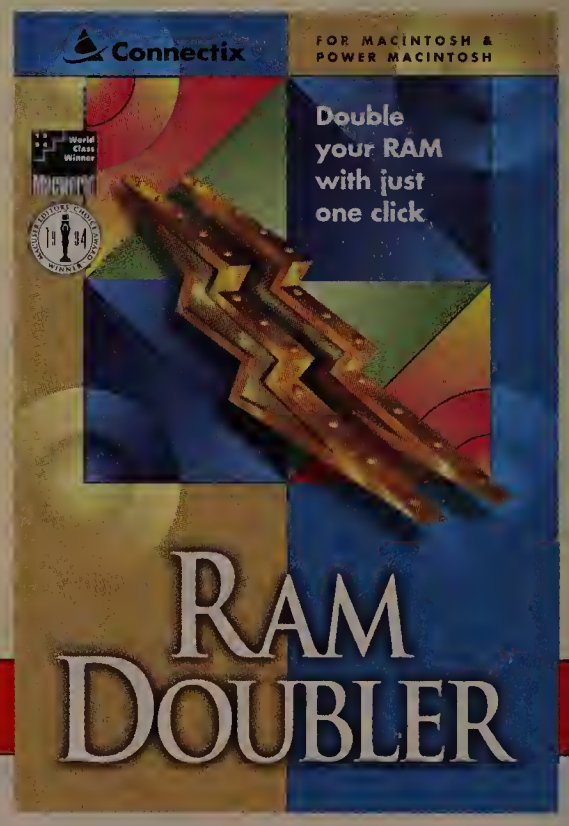
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System Requirements: Macintosh equipped with a 68030, 68040 or PowerPC microprocessor. System 6.05 or later, including all versions of system 7 • 4 MBs required (hard disk required for machines with 4 to 6 MBs) • Not compatible with Mac SE, original Mac Classic, original Mac LC or PowerBook 100 or Mac II without a 68851 PMMU or any accelerator that does not work with virtual memory.

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New Architrion

BAGH's new version of this CAD product provides design and drafting tools for architects and designers. New Architrion is based on an extended-precision floating-point data structure that supports complex surfaces. Users can move between 2-D and 3-D, maintain design intentions as objects are moved, and



New Architrion

automatically create certain forms. New Architrion's open Application Programming Interface permits the creation of custom applications. Requires Power Macintosh, 16MB of RAM, System 7; color monitor recommended. $4500. BAGH Technologies, 514/273-0522, 800/561-0522; fax 514/273-3059.

Newt Tools

No, this isn't a set of tools to help Newt Gingrich enforce the Contract with America. It's a set of six integrated utilities for managing your Newton MessagePad. The Newt Tools main menu is the core application for the integrated tools. The ButtonBar launches applications; the Memory Tool performs diagnostics to alert you to potential data problems. With the Package Tool, you can move, delete, hide, and archive applications. The Soup Tool and Soup Editor help you manage your files. Requires Newton MessagePad, Newton Operating System 1.3; PC Card (formerly PCMCIA card) for storage recommended; software installation requires Mac SE/30, 4MB of RAM, System 7, and a high-density floppy drive. $44.95 company's estimated price. Ascribe Software, 415/331-0717, 800/732-8608; fax 415/331-0711; **ascribe @eworld.com**.

PixelPutty Solo 1.5

This inexpensive modeling and character-animation software was designed by a professional animator so he could achieve the organic-looking 3-D models with naturalistic movement his work demands. PixelPutty Solo supports Boolean operations; nine types of spline curves, including NURBS; and the ability to define the relationship between vertices on a mesh, for realistic sculpting and stretching effects, for example. Advanced animation features in the new version include inverse kinematics, vertex level alignment, and path animation with velocity controls. A MacRenderMan-compatible application, PixelPutty Solo supports RIB, DXF, and 3DGF file formats. $399. The Valis Group, 415/435-5404, 800/825-4704; fax 415/435-9862; **valisgroup@aol.com**.

ScreamSavers

Your coworkers will be too scared to snoop through your files when your computer is displaying Binary Software's ghoulish ScreamSavers. This screen saver has 15 animated modules of wart-covered, disembodied heads that terrorize your desktop and scream through space. The included After Dark control panel provides password protection, and its Ecologic Power Manager will shut down an Energy Star–compliant monitor after a user-defined period of time. $44.95. Binary Software, 310/449-1481, 800/824-6279; fax 310/449-1473; **binarysw@aol.com**.

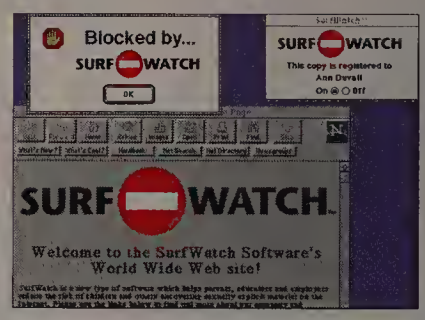
Session 2.0

This multitrack audio-editing system supports 2 channels of recording, 4 to 12 tracks of simultaneous playback, and digital parametric EQ. Session synchronizes to QuickTime video, and imports and exports mono and 16-bit stereo sound in .WAV, AIFF, SDII, QuickTime audio, and System 7 sound formats. Users can edit audio during playback. Requires Mac IIci, 8MB of RAM, 13-inch color monitor, System 7.1, QuickTime 2.0, Audiomedia II or Sound Tools II for Mac IIci or Quadra-series machines. $395. Digidesign, 415/688-0600, 800/333-2137; fax 415/327-0777.

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Requirements: Macintosh equipped with a PowerPC, 68040, or 68030 microprocessor • System 7.0 or greater • 8 MB physical RAM or greater • Compatible with Connectix RAM Doubler • Not compatible with Mac Plus, Mac SE, original Mac Classic, original Mac LC or PowerBook 100

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and its advisers) newsgroups, World Wide Web pages, chat channels, and files from FTP sites. The software is a control panel that can be turned on and off. Company's subscription service updates the list of sites to be blocked. Requires System 7, MacTCP 2.0. $49.95; updates $5.95 per month. SurfWatch Software, 415/948-9500, 800/458-6600; fax 415/948-9577; **info@surfwatch.com**; **http://www.surfwatch.com**.

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Visual Arranger

If Schubert had used this product (or lived longer), perhaps he would have finished his Eighth Symphony. Visual Arranger lets both novice and experienced musicians create, compose, and arrange music. The software offers an icon-based layout for recording and arranging chord progressions, phrases, and melodies. Users choose from eight accompaniment groups: ballad, dance, jazz, Latin, pop, R&B, rock, and world music. Completed songs can be played on any MIDI device. Requires 68020-based Macintosh, 8MB of RAM, MIDI interface or MIDI-compatible sound card, MIDI tone generator or external keyboard, speakers, System 7.1. $59.95. Yamaha, 714/522-9937, 800/301-7076; fax 714/228-3913.

CD-ROMS

Baseball's Greatest Hits

Tired of all the noise about labor disputes and the late season? Let Baseball's Greatest Hits take you back to the heady days of yore. This CD has commentary from Mel Allen, audio clips, photographs, and rediscovered video clips such as Babe Ruth's legendary call of his own shot in 1932. It includes player stats and bios, team histories, and a trivia game. $49.95. The Voyager Company, 212/431-5199, 800/446-2001; fax 212/431-5799; **http://www.voyagerco.com**.



Baseball's Greatest Hits



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Nine Month Miracle

If ultrasound images don't provide you enough information, try Nine Month Miracle. This CD-ROM takes you from conception to birth, using real-life video, sound, photography, and medical animations. The CD shows the developing fetus and a pregnant woman's body as they change month by month. A chapter for children uses games to explain the pregnancy. You can even set the normally movable fig leaves to no-peek mode to keep private parts modestly hidden. $39.95. A.D.A.M. Software, 404/980-0888, 800/755-2326; fax 404/955-0611.

Science Navigator

Release 3.0 of this reference tool for scientists, educators, students, and writers combines two reference books, the *McGraw-Hill Concise Encyclopedia of Science & Technology* and the *Dictionary of Scientific and Technical Terms*, on a single compact disc. Science Navigator: McGraw-Hill Science & Technical Reference Set examines the physical, earth, and life sciences, and engineering. It includes articles, drawings, photographs, and over 100,000 definitions of scientific terms, plus chemical formulas and structures. $149.95. McGraw-Hill Professional Book Group, 800/722-4726; fax 614/759-3644; **comments@mcgraw-hill.com**.

Space Quest 6: The Spinal Frontier

Gamers rejoice: version 6 of this popular spoof on space adventures is here. In this game, space janitor Roger Wilco travels through the bloodstream of his cohort, corps member Stellar Santiago, passing through her vital organs on the way to her brain, where the evil Sarpei awaits. The new version has more sounds, new rooms, and lots of science-fiction spoofs. For all ages. $55. Sierra On-Line, 206/649-9800, 800/757-7707; fax 206/641-7617.

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BOOKS

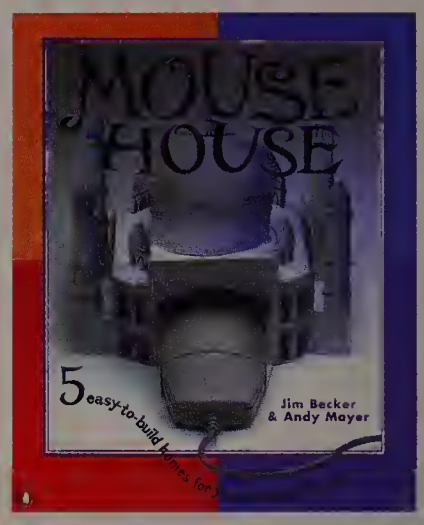
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The Macintosh System Fitness Plan
Dan Shafer aims to help you increase your Mac's performance while you reclaim space on your hard drive. First the author leads you through the System Folder and advises you which items you can throw away. Then he helps you interpret file creator types and identify those big files that have been freeloading on your hard drive for the past few years. Shafer tries to instill in you habits that will keep your Mac speedy and spacious. 176 pages. $14.95. Addison-Wesley Publishing, 617/944-3700, 800/822-6339; fax 617/942-1117.

Metrowerks CodeWarrior Programming for the Mac
Dan Parks Sydow gives programmers a complete introduction to using Metrowerks' popular CodeWarrior development environment for programming the Mac in C++. The book covers both 680X0 and PowerPC code. The bundled CD-ROM includes CodeWarrior Light, a limited version of CodeWarrior. 386 pages. $34.95. MIS Press, 212/886-9389, 800/488-5233; fax 212/807-6654.

Mouse House
After a hard day in front of your Mac, you get to go home, so why shouldn't your mouse? Subtitled *5 Easy-to-Build Homes for Your Computer Mouse,* this book gives you everything you need to build a haven for hand's best friend. And we're not talking downscale Mac Classic homes. Authors Jim Becker and Andy Mayer include materials to build a color paperboard Taj Mahal, Chartres Cathedral, Parthenon, White House, and Golden Pavilion. 40 pages. $9.95. Penguin USA, 212/366-2272, 800/526-0275; fax 212/366-2666.

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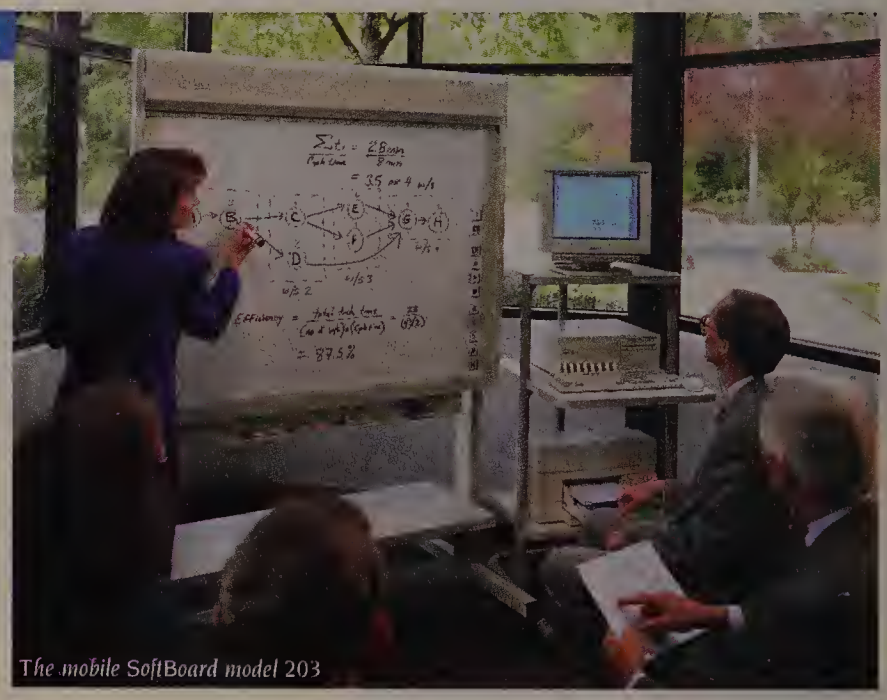
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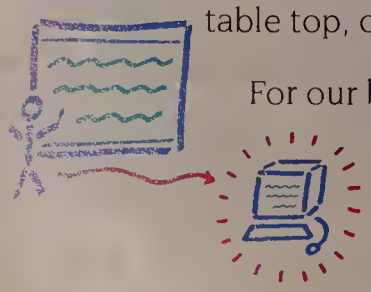
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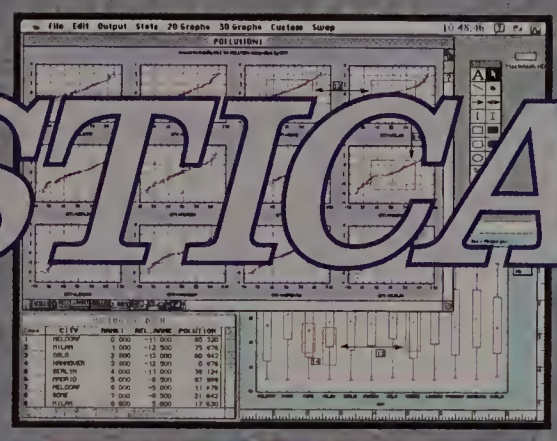
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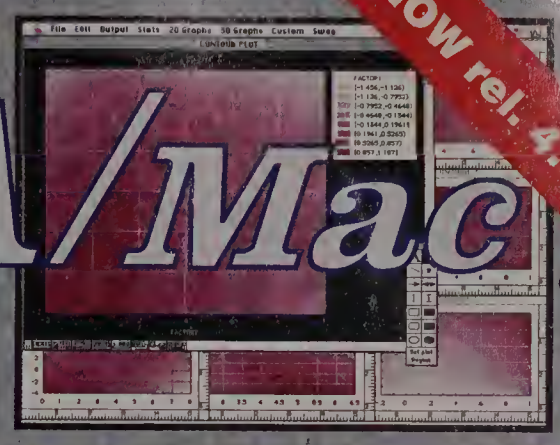
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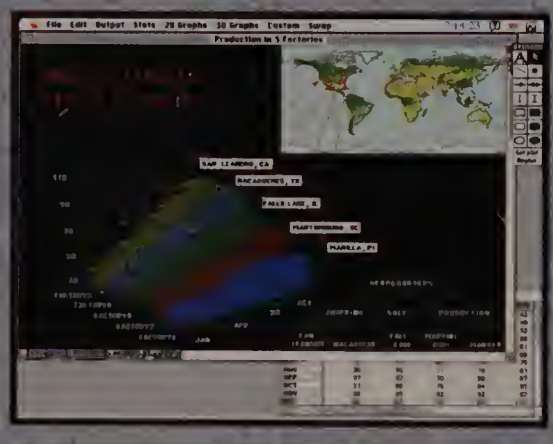
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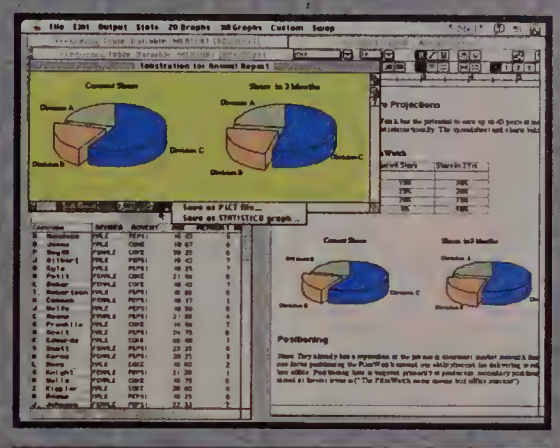
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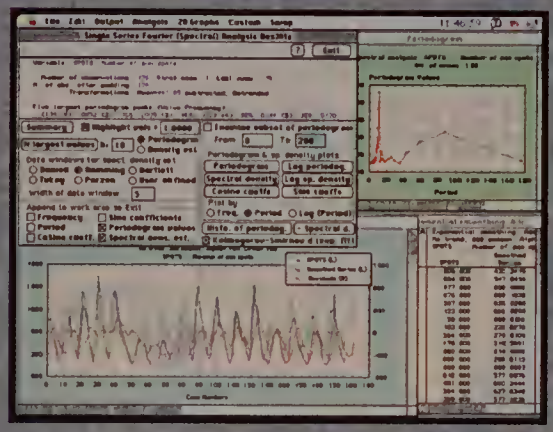
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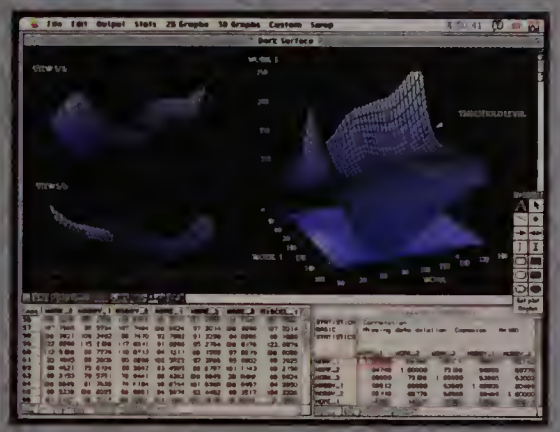


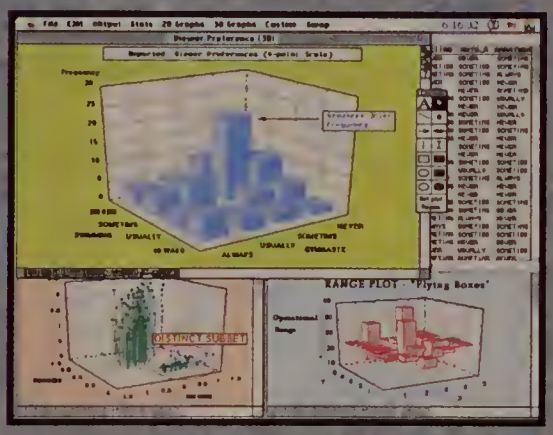


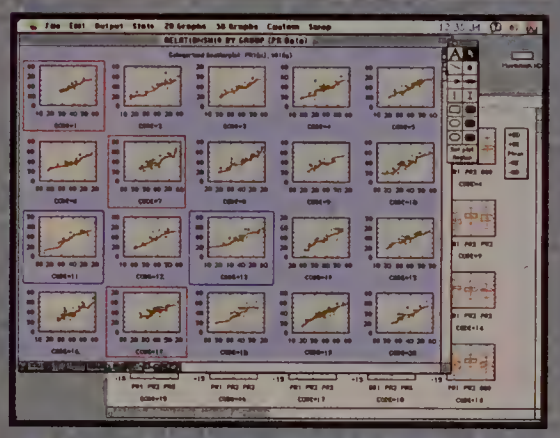


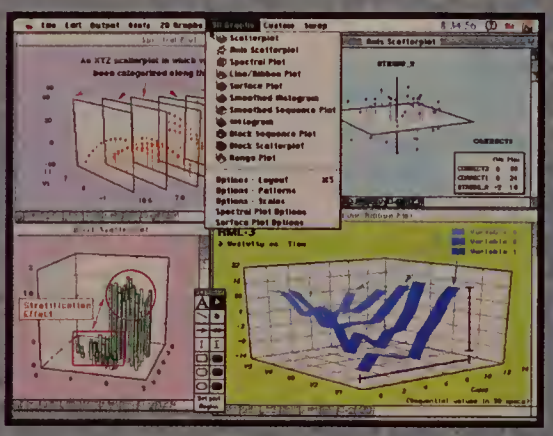


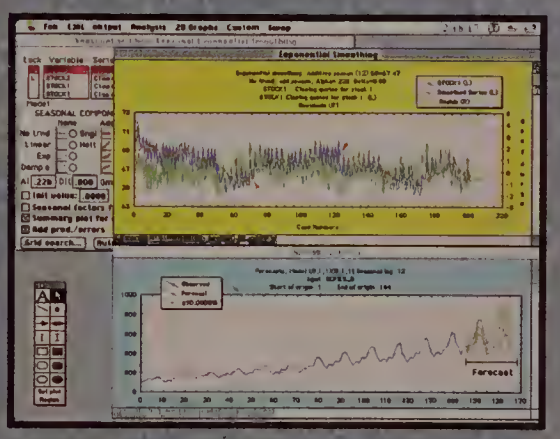


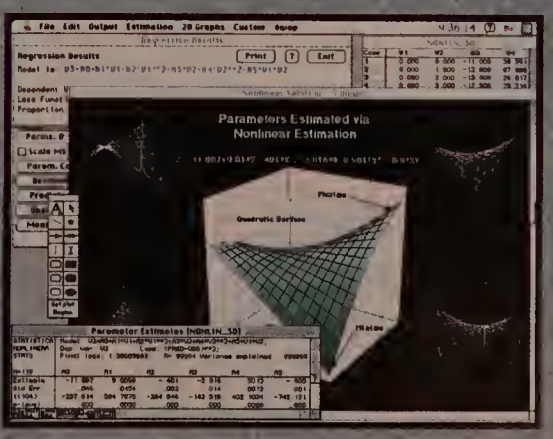


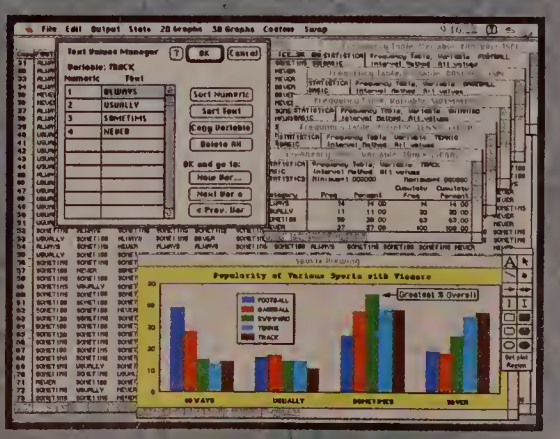












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Here's what's going on in our head. Pencil sketch is scanned into Adobe Illustrator. Rainbow color effect ❶ is created with Linear Gradient. Scanned eye ❷ is colorized in Photoshop to simulate a sunglass effect. Grid of green & black in the other lens ❸ is altered with Twirl filter. Circles are added to the bottom of the letter "A" ❹, Pathfinder filter unites them. Letter is imported into Adobe Dimensions™ which adds perspective. Brush stroke ❺ is created with the Calligraphy tool and then painted with multi-color Gradient. The spreadsheet chart ❻ is converted into an Acrobat PDF file and imported. Light bulb glow ❼ is achieved with Shape Blending tool. Punk filter creates spikes ❽ on globe. Entire ad was created and spell checked using Adobe Illustrator 5.5.

*The Adobe Graphic Sampler CD is $9.95 plus appropriate sales tax. Adobe, the Adobe logo, Adobe Illustrator, Acrobat, Adobe Dimensions, and the tagline, "If you can dream it, you can do it" are trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. All other marks and trademarks are the property of their respective companies. ©1995 Adobe Systems Incorporated. All rights reserved.

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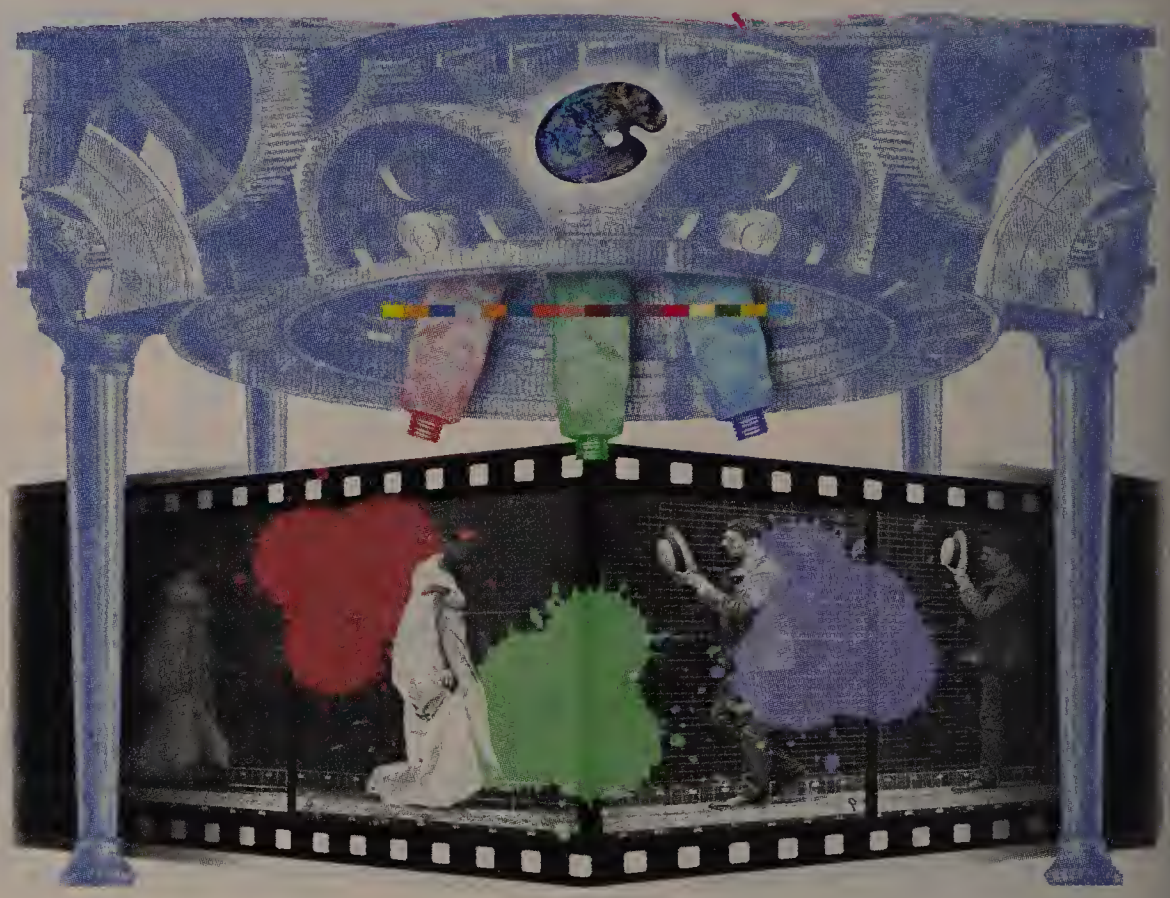
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MediaPaint 1.0

QuickTime Paint Tool

PROS: Paints on QuickTime movies; automates rotoscoping tasks. **CONS:** Demands extensive hardware resources; only one level of Undo. **COMPANY:** Strata (801/628-5218). **LIST PRICE:** $695.

MW ★★★★



STUART BRADFORD

POWER MAC SPOTLIGHT · MACWORLD

DESPITE ALL THE FANFARE surrounding recent movies, creating cinematic special effects remains painstaking and time-consuming. For instance, to eliminate the telephone lines and jet exhaust hovering in the background of a Western set in the 1870s, an artist must go through the scene frame by frame and paint over the wires and jet trails—a technique called rotoscoping.

Sure, computerization helps, but even with digitized images you often must transfer the affected frames to an image-editing program and edit them one frame at a time. That's why artists look bleary-eyed when they go up to get their Oscars.

Anyone who produces special effects for QuickTime movies should examine MediaPaint, a program that removes some of the tedium of special-effects work by allowing you to edit ranges of frames. MediaPaint breaks down a movie to its individual frames and lets you copy paint strokes and pixel manipulations from frame to frame, automating rotoscoping tasks. You can even paint on a QuickTime movie as it plays.

You may remember MediaPaint as Video Graffiti. Acquired (from Neil Media) and renamed by Strata, it is now a much improved program that includes alpha-channel capabilities for compositing (superimposing) images, an onionskin tracing feature, and support for pressure-sensitive tablets.

MediaPaint is a RAM hog; the program relies on many memory buffers to offer the features it does, so you'll need to populate your SIMM slots. Though RAM requirements vary depending on the frame size of your movie, working with 640-by-480-pixel images requires a minimum of 33MB of RAM—that's free RAM available to the program, not the total RAM in the Mac. MediaPaint runs on 680X0 Macs, but plan on using a Power Mac (it's Power Mac native), since programs like this must perform some intensive rendering.

Windows and Layers

When you first open a QuickTime movie in MediaPaint, it appears as a collection of individual frames in the scrollable Filmstrip window, where MediaPaint stamps each frame with a time code. Though you can't paint on frames in the Filmstrip window, you can specify In and Out points for applying special effects across a range of frames.

You paint and edit frames in the Document window, where you work in the invisible Paint layer that MediaPaint places over any QuickTime movie you open. MediaPaint preserves the original movie in an inviolable Movie layer to protect it. As you edit frames in the Document window, MediaPaint uses a memory buffer to immediately update those frames in the Filmstrip window. Unfortunately, MediaPaint offers only one level of Undo—unlike the multiple Undo levels in Adobe's After Effects—which can force you to revert to the last saved version of your movie to eliminate unwanted effects. When you save, MediaPaint creates a new QuickTime file containing your edited movie, separate from the original QuickTime movie file.

Media Painting

If you use Adobe Premiere for QuickTime editing, you have to export your movie as a filmstrip file so you can paint on the movie using Adobe Photoshop, and Photoshop lets you paint only one frame at a time. MediaPaint's principal strength is the Autocopy mode, which speeds up rotoscoping by transferring paint from frame to frame over the sequence of frames you define. When you select Autocopy New, the program transfers the just-applied paint to subsequent frames. Select Autocopy All, and MediaPaint applies all of your edits in the selected frame to the next frame. Rotoscoping in MediaPaint is fast and easy because you step through the movie frame by frame and tweak the copied effects rather than reapplying your effects for each frame.

Autocopy is a memory buffer, so it always applies the paint from the first selected frame to the second, even if you move backward through the filmstrip. This enhances the versatility of autocopying, since you can create special effects in reverse chronology or skip frames when applying paint to produce special effects with a staccato delivery.

MediaPaint also provides a Stencil layer (actually a memory buffer) that holds PICT images and QuickTime movies. Stencil items appear in a window similar to the Filmstrip window and can be applied to the Paint layer using any of the program's brushes or filters (see "Stencil Images"). For example, you could select a PICT file in the Stencil layer and apply it as a translucent image to an entire frame in the Document window, producing the effect of looking through a reflection-filled window pane.

When the Stencil layer holds a QuickTime movie, the frames in the stencil strip are synchronized (by time codes) with the frames of the movie displayed in the Filmstrip window. As you move back and forth over the length of a movie in the Filmstrip window, the stencil strip tags along, letting you always see the current state of both movies. And since the two movies are always in sync, when you paint the sequence of stencil images over the frames of your target movie, the stencil movie plays inside the frames of your finished edited movie. For example, you could position a QuickTime movie in the Stencil layer to play on a blank TV screen within your target movie, or you could blend a movie containing an animated character with your target movie.

Ghosting and Compositing

MediaPaint's Lightbox feature acts like digital onionskin paper; you see ghosted images (from frames both before and after the currently selected frame) in the background of the frame being edited in the Document window. You can trace over the ghosted images or use them for reference as you paint, helping you to create smooth progressions in your painted effects over multiple frames.



Stencil Images MediaPaint's Stencil layer lets you paint PICT files and even QuickTime movies onto the movie you're editing.



Media Particles MediaPaint's particle tools—PixieDust here—automatically generate animated sequences that can be painted on QuickTime movies.

MediaPaint lets you set alpha-channel values for anything in the Paint layer, so you can seamlessly blend whatever you create with the background movie. Though compositing works well, you can work on only one layer at a time; you have to fuse each layer with the movie before moving to your next layer. Adobe's After Effects provides more powerful compositing features, especially since you can work with several separate layers simultaneously, but it also carries a $1995 price tag.

MediaPaint also allows you to composite images using the chroma-key technique, similar to the blue-screen superimposition method used in television and film. When you're working with images in the Stencil layer, MediaPaint's chroma-key feature lets you adjust the transparency of selected (keyed) colors. When you apply the image to the Paint layer, the keyed colors drop out, allowing both previously applied paint and the underlying movie to show through.

Media Tools

Floating palettes hold tools, brushes, colors, patterns, movie controls, and strokes—predefined tool movements that can be used with any brush. An Info palette provides data on cursor location, distance traveled, and angle of movement, for precise positioning of paint elements. If the screen gets too cluttered, you can use the Samples palette, which displays the currently selected items from other palettes.

MediaPaint's strokes are terrific for automating repetitive effects. You define strokes by painting in the active window while the program records the stroke path. Later, you can use the same path with any tool, in any currently selected color or pattern. And MediaPaint lets you apply strokes over a sequence of frames.

MediaPaint expands its assortment of built-in tools and brushes via plug-ins. You access plug-in tools—including an airbrush, a fine-line brush, a pixel-sharpening tool, and a shape painter that lays down random splatters—from scrollable icons on the tool palette. MediaPaint's tools are well suited to the demands of producing and editing special effects.

MediaPaint also includes a selection of plug-in process filters that produce global transformations, such as blurring, diffusing, and fade-in/fade-out effects. Many of the program's process filters are tweenable, meaning their effects can be applied across a sequence of frames. You set filter values for the beginning and ending frames and MediaPaint calculates the values for the intervening frames. For example, MediaPaint's Fade Out filter allows you to fade a movie gradually over several frames simply by selecting values for a beginning and an ending frame. MediaPaint also accommodates most of your favorite Photoshop filters.

Finally, MediaPaint offers four particle tools that create animated effects by painting automatically over a sequence of frames. The PixieDust tool produces particles that fly according to user-defined gravity and friction settings (see "Media Particles"). The SpinOut tool generates spinning particles that leave trails. The Squiggle tool builds wriggling, wormlike lines. And the BabyBoom tool creates particles that self-propagate at user-regulated rates. All four tools generate particles randomly, so their effects differ each time, even with identical settings.

The Last Word

Despite its hefty RAM requirement, MediaPaint is an excellent, well-conceived program suitable for multimedia developers or video editors. Though MediaPaint may not return the glamour to filmmaking, it helps reduce the tedium of special-effects work.

—CARLOS DOMINGO MARTINEZ

SmartSketch 1.0

Drawing Software

PROS: Innovative; intelligent graphic objects; easy-to-use drawing tools; great price.
CONS: Lacks high-end illustration tools.
COMPANY: FutureWave Software (619/637-6190). **LIST PRICE:** $69.95.

MW ★★★★

SMARTSKETCH IS A NEW SPECIES OF graphics program that unites the free-form creativity of a paint program with the structure and precision of object-oriented drawing. SmartSketch's intelligent routines perform pattern recognition, reduce the steps involved in building objects, and simplify on-screen geometry. And the program introduces graphic objects that you can apply with brushes, delete by erasing, and manipulate simply by dragging on them.

Aimed at, and priced for, novice computer users, SmartSketch won't replace high-end paint or illustration programs, but it may be an appealing tool for professional artists and illustrators, who can use it with other programs—importing and exporting EPS, DXF, object PICT, and bitmapped PICT files.

Pretty Smart

SmartSketch blurs the distinction between paint and draw programs by integrating painting with object graphics. SmartSketch lets you draw an object with a brush, but you can't edit the strokes as individual pixels. You're actually drawing a free-form, color-filled object.

These brushed-on objects don't behave like filled objects in traditional draw programs, however. When you apply another brushstroke, SmartSketch adds the new stroke to the object, rather than building a separate object atop the first stroke. The program can do this because it knows the boundaries of the first brushstroke object. When it recognizes a second stroke with the same fill characteristics, SmartSketch assumes you're adding it to the first, whether you apply it immediately or hours later. If you alter the fill color or pattern, the program builds a second brushed-on object over the first.

SmartSketch's understanding of objects gives it some intuitive masking capabilities. A pop-up tool palette lets you choose whether applied brushstrokes cover an object or mask it. For example, you can define brushstrokes that affect only fills, leaving lines intact. When you select Paint Inside, SmartSketch applies the brushstroke only within the confines of the object where the stroke begins.

Since SmartSketch brushstrokes are objects, you can drag them freely about the document. Better yet, when you want to reshape objects, SmartSketch doesn't restrict you to specific object handles or control points. You simply click and drag anywhere along the object's edge, and the fill expands and contracts as necessary.

If you want to cut the object in half or delete part of it, SmartSketch lets you just erase it. If you use SmartSketch's outline mode, you can see that when the eraser cuts the object in half, or takes a gouge out of it, the object heals itself along the line of the eraser stroke; the resulting objects remain fully editable. Like the brush, the eraser can be set to discriminate between lines and fills and to mask objects. A Faucet option lets you erase whole fills or contiguous lines with one click. Pretty smart, eh?

Smart Tools

Even with all its built-in intelligence, SmartSketch remains a very simple program. The aforementioned brush and a pencil that builds lines and geometric shapes are the only drawing implements on the modestly sized, context-sensitive tool palette. SmartSketch's pencil behaves much like traditional pencils, but offers some enhancements of its own.

Smooth and Straighten options help the pencil produce sharp lines and flowing Bézier-like curves, although without the control points and anchor points common to digital Béziers and splines. Instead, you simply drag anywhere along the lines to reshape them.

When you use the pencil to overlap lines (or a brush to overlap brushstrokes), SmartSketch both joins and segments them. For example, you can build shapes that become joined and can be filled with the paintbucket, but all the segments remain independently editable.

With SmartSketch's pattern-recognition feature turned on, you don't have to draw shapes perfectly. The program evaluates the lines and builds the shape automatically—provided the shape is simple. Try to draw a pentagon, and depending on your sketch, the program could build a rectangle or a circle.

The paintbucket also recognizes shapes and executes fills even when the shapes are not completely closed. However, the program could use an explanation dialog box noting that a fill wasn't completed because the gaps were too large to bridge. With SmartSketch's inkbottle tool, you can alter line weights and apply patterns to any line, including the normally invisible (zero-thickness) bounding lines of brushstrokes.

And there's more. You can ungroup and edit text elements as you would any other SmartSketch object. The program includes a drag-and-drop library and over 500 clip-art images. The Smooth display



Smart Editing You can reshape an object in SmartSketch simply by dragging anywhere on its edge. Even complex curves can be manipulated without control handles and anchor points, and the color fill adjusts to changes automatically.

command lets you preview high-resolution printed output. And a multipage document feature (used for the on-screen tutorials) lets you create anything from flipbooks to presentations.

The manual is concise and helpful (though page numbers in the index are wrong), but SmartSketch's unique ways with graphic objects may be confusing at first. For example, when you click on objects sequentially with the arrow, SmartSketch adds them to a selection. Shift-clicking to make multiple selections works only with the lasso tool. And if you put one object over another, the program (like a paint program) can replace the object below. It doesn't take long to adjust to such differences and it's a small price to pay for so much innovation.

If anything, SmartSketch leaves you greedy for more. Users who rely on the functionality of high-end illustration packages may find the lack of bells and whistles constraining. And the melding of paint and draw concepts is so good, I confess to hungering for more tools—airbrushes, gradient fills, and so on.

The Last Word

SmartSketch is a terrific graphics program for beginning computer users or novice artists. It won't cause pros to forgo paint and illustration packages, but many will find SmartSketch interesting to explore and may adopt it anyway. SmartSketch is more than smart, it's positively brilliant.—CARLOS DOMINGO MARTINEZ

SledgeHammer8000FT

Fault-Tolerant Drive Array

PROS: Preconfigured to operate at RAID Level 5; simple software makes it easy to change error notification and configuration. **CONS:** No remote-analysis software provided for remote troubleshooting; currently must use QuickMail services for remote paging; no support for RAID 3; minor problems with messaging and notification. **COMPANY:** FWB (415/325-4392). **LIST PRICE:** $23,599.

MW ★★★

MW LAB IN AN AGE OF TELECOMMUTING, round-the-clock businesses, Internet Web servers, and increasing digital dependency, the SledgeHammer8000FT from FWB—an 8GB, Level 5 RAID system—provides constant access to your stored information.

The $23,599 SledgeHammer8000FT is an enclosure and array controller with redundant power supplies and fans, a SCSI-2 Fast/Wide interface, and seven drive slots, into which you can plug drives even while the array is powered on. It includes six 2GB Seagate Barracuda drives, an FWB JackHammer SCSI-2 Fast/Wide NuBus board, a DAT drive, Retrospect backup software from Dantz, and the SledgeHammer8000FT ToolKit software needed to configure the array. FWB also includes its Hard Disk ToolKit software so that you can repartition the array.

If 8GB is not enough storage, there's a 16GB SledgeHammer16000FT for $28,599. Arrays are available in desktop, tower, or 19-inch rack-mountable enclosures. Versions that use PCI instead of NuBus JackHammer boards cost $200 less.

Ensuring that your data is always available and reliable demands some extra consideration. FWB provides spare drives at reasonable costs: $2259 for a 2GB drive and $3099 for a 4GB. Extra power supplies are $549. The enclosure carries a three-year warranty and the drives have a five-year warranty. Although returning faulty drives is easy enough and FWB's technical support is very good, on-site service is not available directly from the company.

Safety in Numbers

The SledgeHammer8000FT arrives preconfigured as a RAID Level 5 array. RAID 5 writes data in chunks over five of the drives in the system, using some of the space for parity data—data the array can use to rebuild a drive that breaks. (For more about how RAID works, see the sidebar "RAID by the Numbers" in "The RAID Option," *Macworld*, April 1995.) The sixth drive is an autoswap drive. Autoswapping rebuilds the failed mechanism's information on an extra drive. This is also called hot-sparing because a spare drive is plugged in, powered on, and ready to go when one of the array's drives fails.

Although its performance as a Level 5 array is respectable, the SledgeHammer8000FT runs faster as a Level 0 array. However, I do not recommend it over FWB's other Level 0 arrays. For example, opening a 40MB Photoshop file with the array set as the scratch disk took 145 seconds on RAID 5 and 118 seconds on RAID 0; but in our April RAID tests, FWB's SledgeHammer4100FMF-W at Level 0 took only 93 seconds. You can improve these times by enabling special features of the JackHammer board. However, doing so increases the possibility of losing data and makes these features undesirable for RAID 5.

Unfortunately, the current version of the array does not support the fastest RAID option, Level 3. FWB includes RAID Level 1—drive mirroring—but because mirroring wastes space, is slow, and provides only moderate protection against lost data, even FWB agrees that Level 1 is a poor way to use the array.



SCOTT PETERSON

Crying Wolf

If and when a drive fails, you want to know about it. The SledgeHammer8000FT ToolKit software provides several ways for you to get error messages, including Apple's Notification Manager (the same mechanism that programs like PrintMonitor use to get attention when things go wrong), AppleShare messages, QuickMail, or in a log file.

Of these methods, QuickMail is the most effective. You can send messages through a QuickMail Name Server to any user. Error messages marked "urgent" arrive moments after a failure. This method has two minor problems: the message appears to have arrived from another user rather than from the array (unless you create a user named Array on QuickMail), and the message's title contains a fixed text statement instead of a description of the problem.

You cannot yet send messages directly from a SledgeHammer8000FT array to a paging system such as Ex Machina's Notify, but you can use QuickMail's paging services to achieve the same end. FWB is adding direct paging in the next version of the array.

While testing QuickMail messaging, I found one problem with the array controller. Although no data was damaged when I removed a drive during a file duplication in the Finder, I received about 100 error messages, over 90 percent of which were nonsensical. With an engineer's help I determined that some controller registers had become corrupted. I corrected the problem by simply reconfiguring and reinitializing the array.

Although FWB knows the risks of RAID 5 and recommends frequent backups to the built-in DAT drive, true fault-tolerance requires several things that the SledgeHammer8000FT does not provide: redundant array controllers, host adapters, cables, and servers, as well as uninterrupted power. There's also no way to get technical information about stripe sizes or how individual drives are configured. You can run tests on the power supply and fans to ensure they are in good working order, and you can run integrity checks on your data, but you can't schedule tests to occur automatically.

The Last Word

In price, speed, and configurability the SledgeHammer8000FT is a notch below MegaDrive's MR/5, featured in "The RAID Option." The advantages the SledgeHammer array has over the MR5 are ease of configuration—you must configure the MR5's complex options through a terminal emulator—and integration with common Macintosh services such as AppleShare and QuickMail. The SledgeHammer8000FT's simple strengths will keep your data safe, sound, and online.—TIM WARNER

Power Secretary Power Edition 2.0

Speech-Recognition Software

PROS: Lets you dictate at up to 50 words per minute with impressive accuracy; works with QuicKeys and AppleScript for software control; straightforward, logical design. **CONS:** Very expensive; requires at least 12MB of free memory; requires extensive training; some bugs.
COMPANY: Articulate Systems (617/935-5656). **LIST PRICE:** $2495.

MW ★★★★

FOR MILLIONS OF COMPUTER fans, the ultimate fantasy isn't more RAM, a 36-inch screen, or a sextuple-speed CD-ROM; it's voice recognition. Not just the flaky PlainTalk voice-command feature of the Power Mac and AV series ("computer, print"), but bona fide *dictation software*. With Power Secretary 2.0, the day has finally arrived.

You wear a lightweight headset that positions a microphone a half inch from your mouth. Wherever you can type—in your word processor or E-mail program, in a dialog box—you can dictate. You must separate each word by a tiny pause; otherwise you speak normally. To witness an experienced Power Secretary user at work is to believe the future is upon us: the words fly magically onto the screen, amazingly fast, without a single spelling mistake. (I've put a QuickTime movie of Power Secretary at work in the Macworld areas of America Online and eWorld.)

The trick, of course, is *becoming* an experienced Power Secretary user. First, there's the cost: $2495, possibly more than you paid for your Mac to begin with. Second, there's the equipment. Power Secretary requires 12MB of free RAM, or 19MB for fastest operation. Furthermore, it requires 16-bit sound—a standard feature of Power Macs and the AV series, but an add-on, in the form of a NuBus card, for other models. (One such card is the $49 MediaVision Pro Audio Spectrum 16 card, from Tiger Software.)

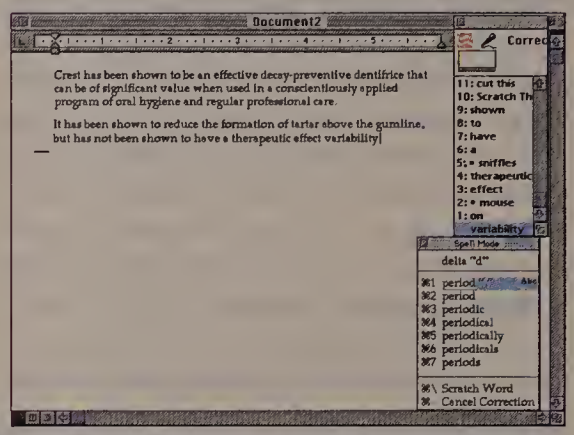
Above all, though, Power Secretary requires patience. Unlike PlainTalk, Power Secretary responds only to *your* voice. When you first get the software, you read 45 minutes' worth of prepared sentences to it, so that the program can get the basic hang of your voice patterns.

Department of Corrections

After that initial training, you're ready to work. And, at first, it *is* work: Power Secretary gets about every third word wrong. At each error, you say "correct word"; the program responds by displaying a small, neat, numbered list of its next closest guesses. If the word you intended is there, just say "choose three" (or whatever its number is), and the program quickly replaces the incorrect word.

Sometimes the word you want doesn't appear in the list—for example, if it's an unusual name. In that case, you spell it, using the pilot's alphabet ("Mike, alpha, Charlie, . . ."), until Power Secretary displays the correct word in its list of guesses. Believe me: after a couple days, you'll know that pilot alphabet cold.

Performing this correction routine, however, doesn't just fix the erroneous word in your document. More important,



Power Corrections The last word spoken was *periodontally*, not *variability*. In this illustration, you can see the correction being made—the word *periodontal* is being spelled out in the pop-up correction window. Just don't get sick, nervous, or tired; like a horse, Power Secretary will know, and won't behave normally.

it teaches Power Secretary that word. Over time, your cumulative corrections improve the program's accuracy dramatically. In fact, after several weeks of daily use, Power Secretary will begin to seem like a science-fiction technology.

Power Secretary's dictation skills are greatly enhanced by its "text macros" feature, which lets you define terms of your own. For example, you can create a text macro that types *Arnold Schwarzenegger, superstar extraordinaire* when you say merely, "Sign this."

Furthermore, you can teach the program to trigger QuicKeys macros or AppleScript scripts, if you know how to use those programs. That is, in addition to simply typing, Power Secretary can also control your Mac—launch programs, choose menus, change monitor settings, and so on—at your vocal command. If this feature sounds like Apple's PlainTalk technology, forget it; Power Secretary's voice control, especially in conjunction with QuicKeys, is far more flexible and far-reaching.

Life without a Keyboard

Unfortunately, controlling your Mac by voice isn't quite as easy as conversing with the onboard computer on the *Star Trek* ships. Although the program's accuracy becomes impressive over time, its poor distinction among homonyms (*there* versus *their*, for example) never improves.

Environmental sounds are another problem. The program succeeds in screening out steady background noise. Sudden sounds, on the other hand, make bogus words appear in your document. Predictable sounds, such as the telephone, are easy to deal with—you record them as text macros that type out nothing. But unrepeatable sounds (sirens, bursts of laughter, and the like) are still an occasional problem. The "scratch that" command, which deletes the last word you typed, is your only recourse.

Finally, Power Secretary is not without a few bugs and incompatibilities. I had trouble getting it to make corrections in QuickMail and QuickDex. It doesn't work at all in Microsoft Word 5, Works, or with the new 9500 machines. The company says it can't re-create the occasional mad-delete-key syndrome I endured (you say "delete key," and the program backspaces furiously over your last several sentences instead of just the last letter). Despite all this, on a Power Mac I achieved speeds of 75 words per minute without stopping, or about 50 wpm with corrections.

The Last Word

Power Secretary has the potential to help doctors, lawyers, and others who must frequently type up standard documents with a lot of big words; people who can't, and aren't supposed to, use the keyboard; or hunt-and-peck typists who hate hunting and pecking. The technology seems magical, but only after many weeks of your time; the price is too high, but not as high as the cost of hiring a typist. (Speaking of money, $995 will buy you a version that works only in WordPerfect and doesn't have the hooks to QuicKeys and AppleScript; $3000 buys you an edition with 60,000 additional medical terms in its vocabulary.) If you have the cash, the RAM, the patience, and a quiet room, Power Secretary can be a powerful, efficient replacement for your keyboard.

—DAVID POGUE

How Do You Tell If It's A "Trinitron"?



Live Picture 2.0

Image Editor

PROS: Reasonable price and RAM requirements; incredibly fast; previews when opening compositions and importing images; batch processing; user control over clipping paths and CMYK separations. **CONS:** Automatic views don't keep up with transformations; inadequate filtering options; no Copy or Paste command; just one level of Undo. **COMPANY:** HSC Software (805/566-6200). **LIST PRICE:** $995.

MW ★★★★

LIVE PICTURE IS AN IMAGE-compositing application that treats scanned images, brushstrokes, and text as independent objects, subject to mathematical transformations and color corrections. The objects remain editable long after you create them, much as in draw programs. And you can manipulate enormous images—50MB and up—without the performance penalty associated with pixel-based editors (most notably Adobe Photoshop). Just as important, you can render the compositions at any resolution.

This is impressive technology, but the initial release of Live Picture was roughly executed, and the $3995 entry price was pure conceit. The newest Live Picture, version 2.0, still falls short of perfection—it's only slightly more powerful and more usable than its predecessor—but the cost has plunged so dramatically, I wouldn't have been surprised to see the product burst into flames on reentering Earth's atmosphere. Last year, you could expect to pay $3995 retail; now, the typical street price is under $700. This may not please so-called early adopters, but it's great news for those prudent souls who waited. Happily, Live Picture is now worth what it costs.

Other than this most laudable price reduction (which was introduced a few months before version 2.0), the new Live Picture boasts lower RAM requirements, down to 24MB minimum and 48MB recommended. Version 2.0 is also faster at importing images, zooming and scrolling, and rendering compositions. (Edits continue to occur virtually instantly on a Power Mac.) And there is no longer hardware copy protection.

Previewing, Processing, and Getting Around

Feature-wise, Live Picture 2.0 is a modest update that is documented in a slim, 50-page addendum. Even so, many of the incremental changes are quite helpful. When you import an image or open a composition, for example, a preview appears in the open dialog box. The preview slows performance slightly, but you can see what a file looks like before opening it. You can also replace one image in a composition with another lifted from disk; this technique permits you to apply identical transformations to more than one image and import new corrected scans in place of old ones.

If you find yourself juggling multiple compositions daily, a new batch-processing function lets you render the compositions unattended. You can even render images in the background, but you'll probably want to let the computer work uninterrupted.

Live Picture 2.0 sports improved views, useful for quickly zooming from one portion of the composition to another. You can speedily and effortlessly render a 72-ppi proof of any view. You can also instruct the program to create a view automatically for every imported image and painting or effects layer you add to the composition. This is an essential feature—particularly since Live Picture doesn't give you any zoom-ratio feedback to show you how image pixels compare with screen pixels—but it could be better implemented. If you move, transform, or delete a layer, the view doesn't automatically keep up. You have to adjust or delete the view manually after you finish changing the layer.



Tweaking the Conversion Table In Live Picture and its proprietary file format, IVUE, you can edit only inside the RGB color space, but version 2.0 does let you modify the RGB-to-CMYK color-conversion table used to render final CMYK images to disk.

Real-World Modifications

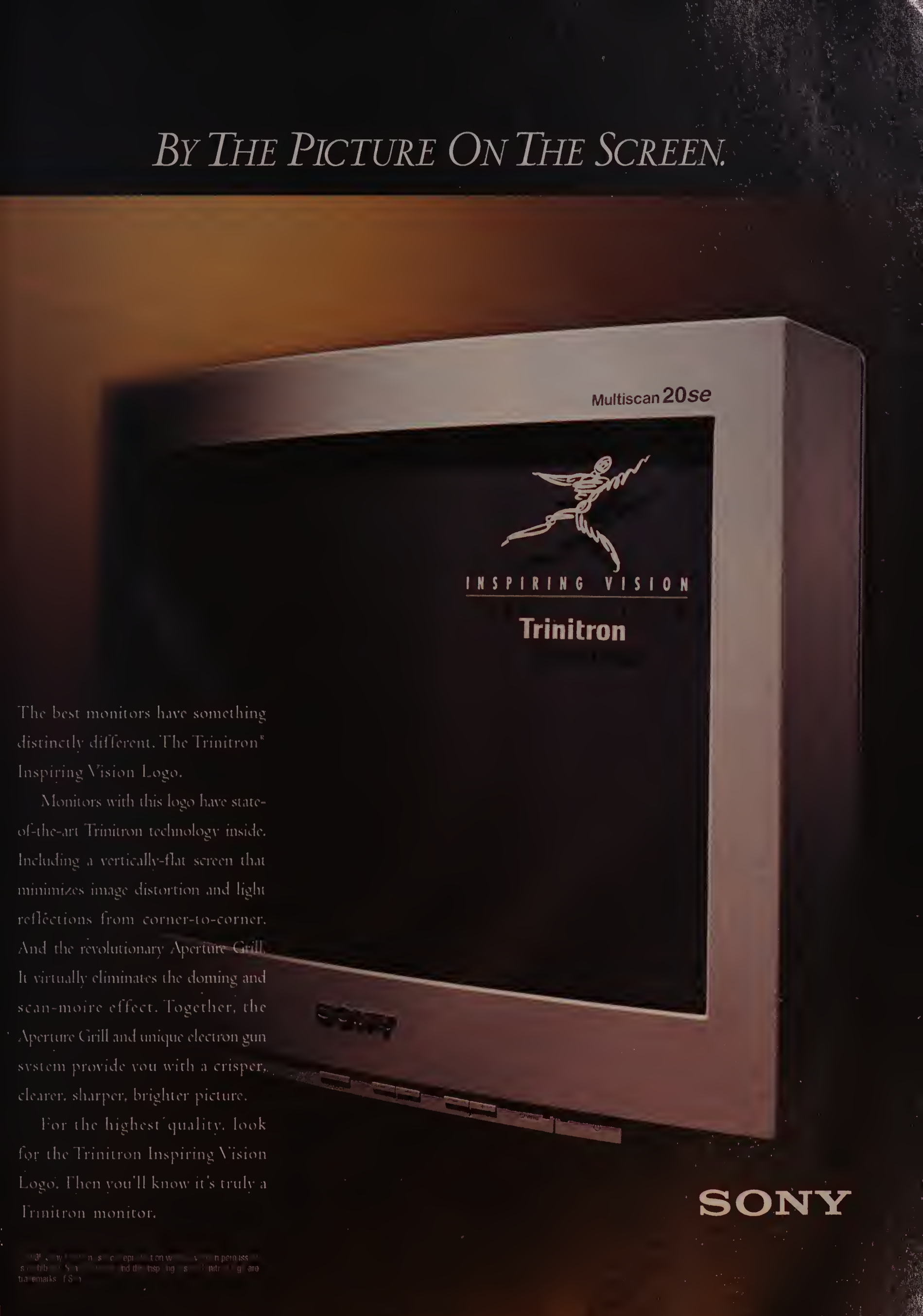
Live Picture 2.0 offers better support for working with other applications. The product ships with a Photoshop plug-in module that permits Photoshop to open Live Picture's proprietary-format IVUE files. You can also convert masks to paths and export a rendered composition complete with clipping paths in either the Desktop Color Separation or Photoshop format. Perhaps most important, you can now fine-tune the separation table that Live Picture uses to render RGB images out to a CMYK composition. Granted, Live Picture's support for the CMYK color space is still pretty rudimentary—you can't import CMYK images directly, nor edit individual CMYK color channels—but you are no longer at the mercy of Live Picture's predefined one-size-fits-all color-conversion tables.

These enhancements are much appreciated, but Live Picture still requires some fairly significant modifications. Its inability to open multiple compositions and lack of support for Clipboard operations (both of which would allow you to transfer edited images between compositions), the absence of blend modes for overlaying images, its imprecise sharpening functions, its refusal to let you modify the contents of any but the topmost visible layer, and its continued reliance on a single-level Undo command (when its underlying technology would clearly support more levels) all qualify as inexplicable omissions.

The Last Word

HSC is fond of reminding potential users that Live Picture is not a Photoshop killer, and version 2.0 shows no sign of proving the company wrong. That's too bad, because with some extra effort Live Picture could render Photoshop obsolete. The application's speed is utterly fantastic, its core technology is generous and flexible, the price and memory requirements are more realistic than they were, and the software is increasingly stable. But HSC needs to address the mundane but very real needs that its users are bringing to the table, by filling in the feature gaps and tightening the interface. After all, if Photoshop isn't going to come through in the speed and resolution-independence departments, then what most high-end users are going to want—and what HSC and others should concentrate on delivering—is a fully equipped and fully mature, no-holds-barred Photoshop killer.—DEKE McCLELLAND

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StyleWriter 1200

Ink-Jet Printer

PROS: Inexpensive; software supports watermarks and tiled layouts; automatically powers up for print jobs. **CONS:** Slow when used in Best mode. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** $269.

MW ★★★★

THE STYLEWRITER 1200 IS APPLE'S first new black-and-white ink-jet printer in more than two years. At first glance, this member of the StyleWriter series appears no different from its immediate predecessor; it has virtually the same sleek, smart design as the StyleWriter II, as well as the same 100-sheet (or 15-envelope) feeder. It uses the same ink-jet cartridges as previous models and renders gray-scale images at the same 360 dpi.

The new model, however, offers improved print quality, a better variety of output options, and four additional fonts. It can also handle a few sophisticated printing tasks, such as creating custom watermarks—at a price below that of the StyleWriter II.

Like the StyleWriter II, the 1200 is networkable and supports gray-scale printing. It operates in three different quality modes: Draft, Normal, and Best. At the highest setting, the printer renders gray-scale pages at 360 by 360 dpi and black-and-white pages at 720 by 360. Frankly, I found it hard to see the difference between the two resolutions. Even so, the StyleWriter 1200's output is outstanding in Best mode, with crisp black text, smooth gradients, and unstreaked grays—provided you use a smooth-finish paper. (The StyleWriter's liquid ink produces slightly ragged edges on textured or overly absorbent paper.) On gray-scale images, you can choose between two different halftoning methods—Pattern or Scatter. With the Pattern option, the 1200 creates grays through a fixed pattern of dots. The Scatter method uses randomly placed dots and produces smoother, more realistic-looking grays. But images rendered with the Scatter method take slightly longer to print than those rendered using the Pattern method.

The 1200's new printer driver adds other convenient new functions. For example, the Layout pop-up menu in the Page Setup dialog box now lets you tile two or four document pages onto a single sheet of paper, creating booklet-size documents. Switching to the 2-Up or 4-Up layout setting not only consumes less ink and paper, it's a quick way to turn out miniflyers or booklets without reformatting your full-page documents.

The Page Setup dialog box also allows you to superimpose a watermark on your pages as they are printed. The software comes with eight watermark designs, such as Confidential and Draft. You can position them at the center of a page, in an upper corner, or spread across an entire page. A slider bar lets you control the ink density (darkness) of the watermark image. You can also create custom watermarks (such as a company logo) using your own PICT graphics.

Also new is a Paper Type pop-up menu in the Print dialog box, which lets you tell the printer what type of paper you're using—glossy or flat stock, for example. The StyleWriter adjusts its ink flow based on the paper.



GIBSON

The 1200's energy-saving features are also convenient. If the printer remains idle for more than five minutes, it simply turns itself off. When you send a new print job to the idle printer, it powers up and starts printing.

Apple claims the 1200 can print three pages per minute in Normal mode. That's accurate if you're printing text-only documents; graphics, of course, take considerably longer. Printing text documents in Best mode takes about three times as long—roughly one minute per page.

The Last Word

You can't argue with the value of a StyleWriter. At $269, the 1200 offers high-quality output, even when you're dealing with graphics. Granted, it doesn't crank out pages very quickly or offer PostScript capabilities, but its price-to-performance ratio makes it a perfect low-cost printer for typical home and small-office use.—JOSEPH SCHORR

Helix Express 3.03

Relational Database

PROS: Excellent client-server design; easy-to-learn, graphical approach to building databases; improved performance. **CONS:** Documentation insufficient; lacks index. **COMPANY:** Helix Technologies (708/465-0242). **LIST PRICE:** $589.

MW ★★★★

WITH HELIX EXPRESS 3.03, HELIX Technologies bucks the trend set by the biggest software developers: the latest version adds important features and speed (some functions are two to three times as fast as in the previous release) without raising the program's RAM requirements or price. Helix now features compiled forms for improved speed, a better client-server interface, and conditional branching; and it imports and processes complex data more quickly.

The basic Helix package ($589) is a single-station client-server installation for 680X0 Macs (Helix says a Power Mac version should be ready this summer), with additional client installations ranging from $199 each (for packages of up to 3 clients) to $135 each (for packages of 12 or more). A single Mac can run both the client and server software, so a small network (3 to 8 Macs) usually doesn't need a dedicated server—just make the fastest Mac in the office the server as well as a client. Helix is shockingly compact too; the server and client components require less than 1MB of RAM each.

Helix uses a uniquely visual, drag-and-click method for building databases. You drag icons that represent database elements into a work space, then double-click on the icons to access dialog boxes where you define the characteristics of each database element. For instance, to create a database field, you drag the Field icon (from the icon well, on the left) into the work space, enter a name for the field, then double-click on the icon to access a dialog box where you define the type of data (text, numbers, pictures, documents) that the field will contain. You design database forms (for data entry and reporting) using a similar icon-based method, and the forms-drawing tools of version 3.03 are significantly more precise and flexible than those in the previous release. As before, Helix includes a set of sample databases covering an array of business applications.

Helix provides an easy-to-use, graphical method for relationally linking your

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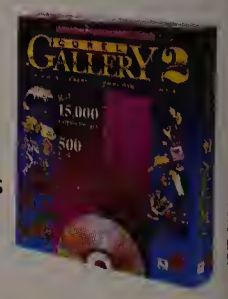
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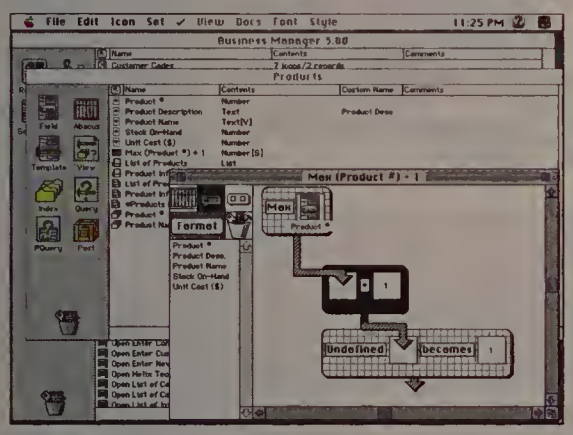
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data tables as well; you simply draw a link between file images on screen (see "A Big Plus"). Helix also facilitates searching for specific records in your data tables—you compose a query in the Quick Query dialog box simply by responding to prompts. (Version 3.03 also offers a Power Query feature for conducting more-complex searches that you can even time for later execution.)

The real power of Helix, however, lies in the Sequence, a sort of assemble-it-with-icons macro that allows you to select and arrange Helix commands for automating and customizing your database functions. For example, you can make a Sequence that adds a menu-bar command to your database to streamline such common tasks as printing (the Sequence will open a table or report, print it, and then close the file). You can develop custom menus using the Sequence feature, allowing you to tailor your database interface for your users. Version 3.03 also supports Sequences that accept conditional branching in addition to the usual straight playback of commands.



A Big Plus Linking databases only requires drawing a link between them on screen. Icon wells on the left supply the elements for building a database.

While Helix compiles forms for better speed, Sequences always have their works exposed in a graphical programming style for easy tinkering. Developers can often address client requests for changes in Helix applications over the phone, walking the client through changing a Sequence. Every aspect of a Helix application (forms, reports, Sequences, data itself) can be separately password-protected to prevent this easy modifiability from getting out of hand.

The Last Word

Though the process is markedly different, building a flat file in Helix is as simple as constructing a flat file using Claris's FileMaker Pro or ACI's 4D, and Helix lets nonprogrammers develop relational databases without extensive training. Helix Express 3.03 is fast, and it's especially appropriate for small-office networks.—CHARLES SEITER

Two Accelerators

601-Based Hardware Accelerators

DayStar PowerPro 601, DayStar Turbo 601

PROS: Simple installation; excellent performance. **CONS:** A few graphics card incompatibilities. **COMPANY:** DayStar Digital (404/967-2077). **LIST PRICE:** PowerPro 601 $1599, Turbo 601 $1499.

MW ★★★★

THE DAYSTAR POWERPRO 601 and the DayStar Turbo 601 represent DayStar's attempt to extract a little more power from its original Power Mac–accelerator engineering. Since the 601 is quite happy at higher clock speeds (Apple's 8100/100 Power Mac is just a 100MHz 601), DayStar has revised an existing 601 design to increase the chip's clock speed.

Do you get your money's worth from these hot rods? (They do run hot, by the way, with heat sinks the size of a Newton.) The brief answer is yes. There are slightly different technical and buying considerations for each card, however.

Turbo 601

With a 100MHz Turbo 601 (it includes a 256K cache) in a Mac IIsi, IIvx, IIci, IIvi, or Performa 600, you get performance on numerical tasks that beats Power Mac 6100 speeds but falls short of Power Mac 8100 performance. Considering the Turbo's price, that's quite an accomplishment. If you confined your interests to scientific matrix math, most of your work would be 20 times as fast. Even if you're an artist instead of a scientist, most operations are 5 to 10 times as fast. At 100MHz this card is so fast that even though a big fraction of the maximum potential speed improvement gets dissipated in video access, memory access, and other bus-limited data transfers, the real-world speed improvement (only 30 to 40 percent of the theoretical CPU speed improvement) is still startling.

Following DayStar's recommendation, I tested the Turbo 601 with a graphics card (the Radius PrecisionColor 24XP) rather than using the IIci's built-in video. Some popular video boards (current Radius and older RasterOps boards) will require ROM or software upgrades for use with the Turbo 601, and you'll have to upgrade to System 7.5. The System upgrade is not included, an economy move that seems a bit stingy. On the brighter side, installation in the PDS slot is extremely easy (the package also includes a IIsi adapter), the control panel for operating the card is simplicity itself, and everything works as expected.

PowerPro 601

This card is designed for the Quadra 610, 650, 700, 800, and 950, and the Centris 610 and 650 (there's a $109 adapter for the 610 systems). It's quite simple, really—install the software, pull the top off your Quadra or Centris case, stick in the card, and watch the fun. I tested the PowerPro 601 (it includes a 1MB cache) and found real-world application speedups typically ranging from 2 to 4 times as fast. For graphics, 3 times as fast with Photoshop filters on big files is important; 1.4 times as fast on Word 6 files may not be worth $1500 to you.

As is the case with the Turbo card, a Macintosh with the equivalent processor has certain speed advantages (in the bus design and video subsystem) over the accelerator card. But with the PowerPro you get near-8100/100 performance for about half the price of a new system, at the additional, negligible cost of about 15 minutes of downtime.

The Last Word

These cards make economic sense, and they're trouble-free. While you could drop a 60MHz 601 card into a 40MHz 68040 system without being dazzled, these accelerators make a serious performance difference.—CHARLES SEITER

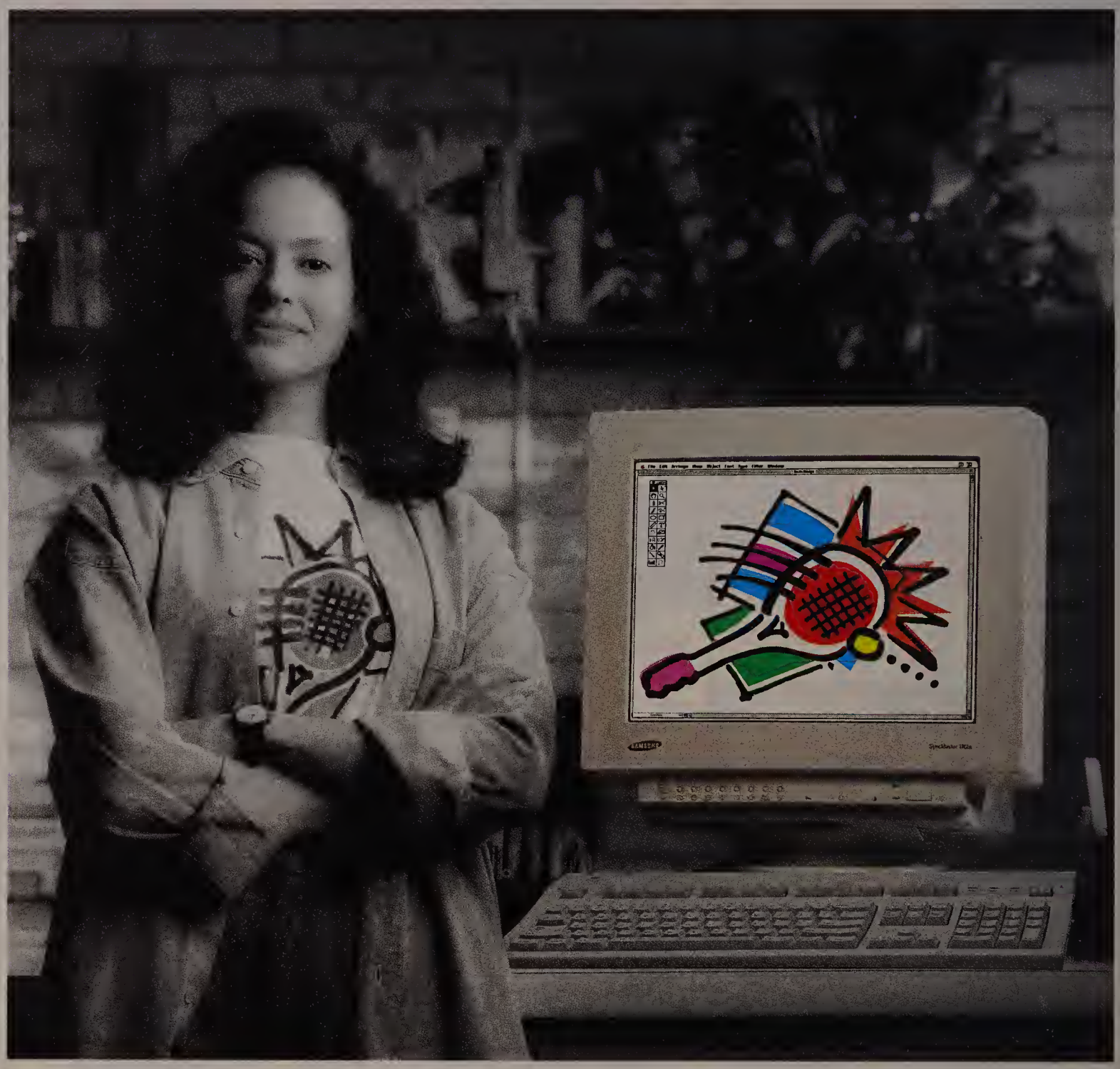
Faster Than Your Basic System: Accelerator Board Speedups

All numbers reported are times as fast as the unaccelerated system.	Pure FPU: I used Speedometer 4.0 to measure floating-point performance.	CPU Index: I used Speedometer 4.0 to measure the overall speed of the CPU.	Color Video: I used Speedometer 4.0 to measure color video throughput.	Rotate: I rotated a 250K drawing 45 degrees in Adobe Illustrator 5.0.
Mac IIci w/ Turbo 601	36.9	11.8	1.4*	5.8
Quadra 650 w/ PowerPro 601	7.0	4.1	1.8	2.0

Mac IIci used a Radius PrecisionColor24 video card.

The Mac IIci and the Quadra 650 both had 16MB of RAM and used System 7.5.1. Note that the Quadra 650 is faster than the IIci.

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SyncMaster	14GL	15GL	17GL	17GLs
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Dot Pitch	.28	.28	.28	.26
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Maximum Refresh Rate at Maximum Res. (Hz)	75	75	75	75
MPR-II (Low Radiation)	•	•	•	•
Power Management	•	•	•	•
Flat Square Screen		•	•	•
On-Screen Programming			•	•
Real Color Control				•
Warranty	2 Years	2 Years	2 Years	2 Years

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Circle 198 on reader service card

Conflict Catcher 3

Extension-Management Utility

PROS: Superb conflict-testing features; customizable list views of start-up files; displays names of start-up files, in addition to their icons, on desktop during start-up sequence. **CONS:** None. **COMPANY:** Casady & Greene (408/484-9228). **LIST PRICE:** $99.95.

MW ★★★★★

WHAT CAN YOU SAY ABOUT A PROgram that garnered a five-star rating from *Macworld* less than a year ago—and just got dramatically *better?* Conflict Catcher II has proven itself to be a flawless tool for managing extensions and control panels. Conflict Catcher 3 is the same—but with this substantial update, the program does its job with greater efficiency and has an even more flexible, friendly interface.

Conflict Catcher's systematic approach to isolating extension conflicts has gotten more intelligent, speeding up conflict resolution. For example, the program now records the date on which each new start-up file is installed on your Mac. When you use Conflict Catcher to track down a conflict, the program starts by turning off the most recently installed control panels and extensions—the most likely suspects when a new conflict arises. It can also scan for damaged start-up files immediately, in case a damaged resource is responsible. And if you have a hunch about which file might be causing the problem, you can even point Conflict Catcher in the right direction using the new Intuition dialog box. With this feature, you identify the suspect files. Conflict Catcher first tests your hunches, then moves on to other suspects if the problem isn't solved.

Even when you're not tracking down a conflict, the program gives you a better handle on the mysterious extension and control-panel files that lurk within your System Folder. You can, for example, have Conflict Catcher display the *names* of start-up files as well as their icons during your Mac's start-up sequence—a great way to figure out the identity of a file you can't recognize by its icon alone.

As in previous versions, Conflict Catcher 3 allows you to group extensions and control panels into sets in order to create customized start-up configurations. You can also assign each configuration its own keyboard shortcut and start-up sound, making it easy to select the configuration you want. During a work session, you can choose from your saved sets using the new Conflict Catcher menu (which appears in your Mac's menu bar at all times), then restart your machine. You can also launch Conflict Catcher from the menu bar at any time. All of this makes managing your start-up files disarmingly simple.

Conflict Catcher's main window now lets you display and sort start-up files in seven different list views instead of four. You can sort files by loading order, name, kind, folder, date installed, or amount of memory used, or by whether they're enabled. In addition, the resizable main window now includes a second column that can display each item's kind, folder, date installed, or memory use. Clicking on any listed file displays even more detailed information about it, such as its icon, version number, type/creator code, and a description of its function.



Sorting Made Easy Conflict Catcher's main window displays all your start-up files in a color-coded list that can be sorted seven different ways. Detailed information about individual items is displayed in the field on the left side of the window. The small button at the top center of the window lets you switch to a different start-up disk without using the Start-up Disk control panel.

The program lets you color-code start-up files in list views—you can have all extensions appear in blue, for example—and the colors are fully customizable. Do you really need to be able to display your list of control panels and extensions in 16 million colors? Probably not—but it certainly doesn't hurt to have such conveniences either.

The Last Word

Even with all these interface enhancements, the price is still right. Conflict Catcher offers unparalleled control over the ever-growing number of components that make up your system software. When conflicts arise, Conflict Catcher helps you home in on the problem with the elegance and efficiency that characterize the very best Mac programs.—JOSEPH SCHORR

InTouch 2.5

Contact Management

PROS: Free-form data entry. **CONS:** No typing shortcuts. **COMPANY:** Prairie Group (515/225-3720). **LIST PRICE:** $69.95.

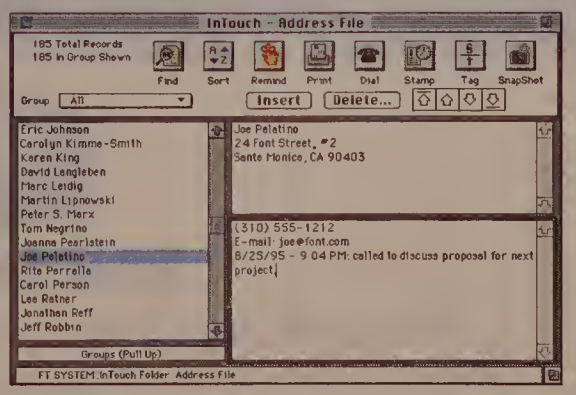
MW ★★★

FOR PEOPLE WHO NEED SPEEDY ACcess to names, addresses, and phone numbers, but don't want to bother with field-oriented programs like Now Contact, InTouch offers a free-form approach to storing personal information. Instead of a separate field for every item, InTouch has only two fields—one for name and address and another for phone numbers and notes. InTouch doesn't include any of the data entry shortcuts (autocompletion, word capitalization, phone number formatting) that most field-based contact managers do, and searching and sorting options are fewer.

Since my last review of this product (*Macworld*, February 1993), the InTouch window has become easier to customize. A scrolling window on the left lists the first line of every record in the current group, and the name/address and phone fields now sport scroll bars. You can also import data from any program that can export in tab-delimited text format. A control panel called Snap lets you look up and copy InTouch contact information from within other applications via a hot-key combination, but this approach is less convenient than menu-bar address finders like Now Software's QuickContact. Although InTouch still lets you set alarms to trumpet upcoming events, most calendar functions are now handled by a separate program called DateView.

The Last Word

If you have to keep track of names and addresses, but you don't need to perform complex sorts and searches, InTouch is a good choice.—FRANKLIN TESSLER



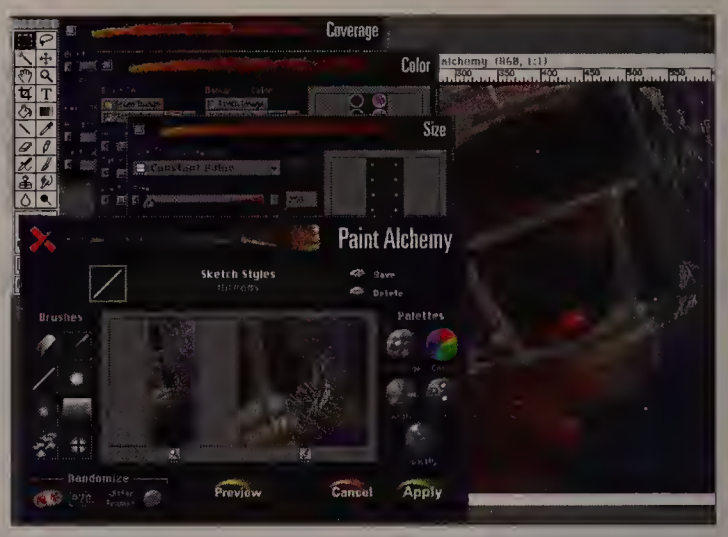
Keeping in Touch You can access most important functions by clicking on the icons at the top of the InTouch window.

Paint Alchemy 2.0

Effects Tool

PROS: Unique; customizable styles; automatic scaling of styles; plugs into a variety of graphics and animation applications. **CONS:** Calculation intensive; RGB processing only; accessing all parameters clutters screen. **COMPANY:** Xaos Tools (415/487-7000). **LIST PRICE:** $199.

MW ★★★★



Digital Clutter Xaos Tools' Paint Alchemy 2.0 does a convincing job of simulating how an artist applies paint to a canvas to create an array of both subtle and dramatic effects, but accessing many parameters does clutter the screen.

WITH THE INTRODUCTION of Paint Alchemy 1.0 in 1993, Xaos Tools seduced vast numbers of Macintosh artists with the sumptuous visual possibilities of its so-called intelligent painting technology. One of the new breed of malleable Photoshop-compatible plug-ins, Paint Alchemy creates fabulously organic-looking results by applying scalable, gray-scale PICT files as brushes on an RGB image. Built-in variation thresholds modulate parameter settings for opacity, color, brush angle, brush size, and coverage density, resulting in a free-form painterly quality. The sheer number of possible style settings available in Paint Alchemy makes it resemble a miniapplication tucked within its host app (possible hosts include DiVA's VideoShop, Fractal Design's Painter, and CoSA's After Effects, among others).

Though the initial release was well received, version 2.0 has addressed some of the quirks of the original. Because Paint Alchemy's core brushing engine uses individual strokes to build up an effect, a densely layered brush is calculation intensive. The new release has been accelerated for Power Macintosh, to provide a speed increase of 500 to 1000 percent depending on the particular effect.

An interface lift has jazzed up Paint Alchemy, changing its drab black-and-white stack of parameter index cards into colorful floating palettes and an expanded brush palette. While the new interface is a nice improvement, I'd still like a brief summary of all the parameter adjustments to appear in the main window, instead of having to keep in mind all the interrelated settings of five floating palettes as I work.

Previews are faster and larger, and styles now group both brush and parameter settings into one preset for easier archiving or exchanges with other users. Better still, styles are now resolution independent, so you can develop styles on a low-res proxy and then apply them to the original hi-res image. Other significant changes include more blending options, as well as improved animation controls for use with Adobe Premiere 4.0 and Equilibrium's DeBabelizer 1.6. You can now animate Alchemy effects over time, either by smooth linear increments or with random jitter-frame variation for a more handmade look.

Paint Alchemy works only with RGB images, so if you want to apply effects to separate channels, you must first place each channel into a new document so that it reads as an RGB image and then reinsert the channel into the original file after processing.

A 68020 CPU running System 7 and an additional megabyte of RAM beyond the suggested size of the host application are the minimal requirements for running Paint Alchemy. But unless you use a 68040 machine or a Power Mac, you'll find the processing time painfully slow. Even with a Power Mac 8100, certain densely layered styles put some drag on your system.

The Last Word

Paint Alchemy adds a distinctive, human look to computer-generated images. Like those of KPT Convolver, Paint Alchemy's user-definable styles make the program vastly more flexible than traditional plug-ins. Though I could wish for more frills in version 2.0 (additional parameter categories and the ability to animate among styles, for starters), Paint Alchemy is an extremely valuable (and fairly economical) tool for a digital artist with the eye of a painter and the workload of a professional.—AVI HOFFER



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Intellihance 1.0

Photoshop Plug-In

PROS: Easy to use; good color-correction controls; includes batch processing macros.
CONS: No preview window; needs better focus controls; Pro Modules lack color-calibration targets. **COMPANY:** DPA Software (214/517-6876). **LIST PRICE:** $129 to $299.

MW ★★★

INTELLIHANCE IS A PLUG-IN FOR Adobe Photoshop that corrects colors, enhances contrast and focus, and reduces graininess in scanned images. Like Light Source's Ofoto—which has long automated similar corrections outside Photoshop—Intellihance can't match the quality of a professional press operator applying adjustments manually. But Intellihance offers speed, consistency, and automation. Why waste your time fixing one image after another when you can teach the program to do it?

The $129 consumer version of Intellihance is designed especially for correcting gray-scale and RGB images. Using a straightforward series of pop-up menus, you specify how the program should correct such factors as contrast, brightness, saturation, and sharpness. For example, rather than boosting the contrast of an image by manipulating complex slider bars or numerical values—as you generally have to in Photoshop—you might just select Snappy from the Contrast pop-up menu. Intellihance analyzes your image and bumps up the contrast to whatever it considers to be snappy.

Despite its simplicity, Intellihance does a very good job of correcting colors in an image, and it's certainly a lot quicker than monkeying around with Photoshop's Levels, Variations, and Curves dialog boxes. But there's no preview window inside the Intellihance dialog box, so you have no immediate feedback. Some people might implicitly trust Intellihance to deliver snappy contrast, but I'd like to get an idea of what *snappy* means before I commit. Also, the focus controls leave something to be desired. Even with the Sharpness option at its maximum setting, Intellihance left the images I tested unacceptably soft.

Using a function called Intellihint, you can instruct Intellihance to base its color corrections on a detail from the image. This is particularly useful when you're correcting flash photography and other images that feature harsh contrast between highlights and shadows. The product also ships with four RGB-to-CMYK separation tables and several macro scripts for use with CE Software's QuicKeys or Affinity's Tempo II Plus.

The more expensive Intellihance Pro package—which costs $299 for CMYK, RGB, and gray-scale modules—offers basic scanner and press-calibration controls. You can correct for brightness values measured from a gray-scale calibration strip, and enter values for dot gain, maximum ink density, and minimum and maximum dot percentage. Press operators will find these controls helpful, but the RGB and CMYK products should include full-color IT8 targets or equivalents. All versions of Intellihance Pro are capable of eliminating dot patterns from scanned halftones, and you can specify black, white, and gamma points when correcting from a detail in the Intellihint window. The RGB and CMYK modules also correct for color casts and support monitor calibration.



Good Color, Soft Focus I opened the top image from a Digital Stock Photo CD as a PICT file—the worst way to go—and converted it directly to CMYK without performing any other color corrections or focus modifications. The bottom image shows the result of applying the Intellihance Pro CMYK filter, set to produce snappy contrast, enhanced midtones, high saturation, and "extra-hard" sharpness. It scored well on all counts except focus. The inset rectangle at right shows my idea of extra-hard sharpness, produced with the Unsharp Mask filter.

The Last Word

Ofoto 2.0 matches most of Intellihance's features, provides better documentation, and offers a few extras such as automatic image straightening and ColorSync compatibility. But if you scan most images directly into Photoshop and you don't want to switch to an unfamiliar program such as Ofoto, Intellihance is both capable and easy to use, delivering color-corrected images with the predictable regularity of an assembly line.

—DEKE McCLELLAND



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ASAP 1.5

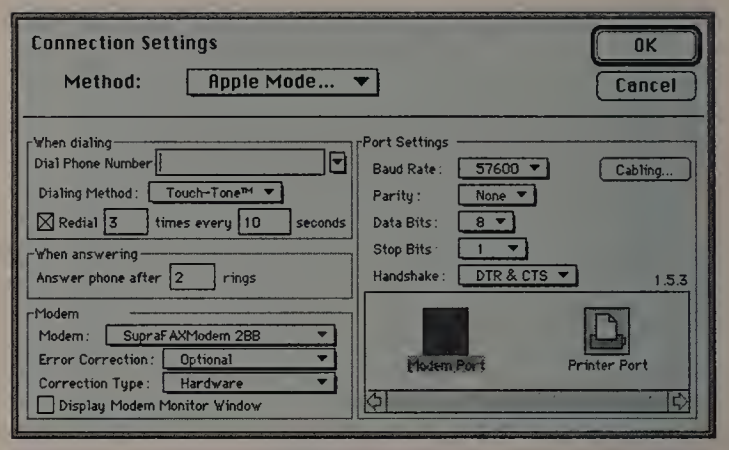
File-Transfer Utility

PROS: Easy setup; simple and straightforward operation; robust performance. **CONS:** Receiver program uses hardware encryption (a minor inconvenience); clients must buy full program to receive files. **COMPANY:** MicroBeam (813/546-2727). **LIST PRICE:** $695; with Windows client program $795.

MW ★★★★

MICROBEAM'S ASAP IS A PRODUCT designed to make it easy for publishers and service bureaus to receive files from their clients. ASAP provides a simple way for users to send files to a distant reception point. Unlike with normal bulletin board system software, there is no complex setup on the part of the BBS operator or on the part of those wishing to send files. In fact, installation and setup can be done by almost any Macintosh or Windows user, with no problems, in about five minutes.

ASAP consists of a sender application that transfers files and a receiver application that accepts them. The receiver program is hardware-encrypted with a protection device that installs in the Macintosh's ADB port (between the Mac and the keyboard); you need to buy a multiuser license in order to install the receiver program on more than one Mac. The sender applications (which come in both Mac and Windows formats) can be freely handed out to clients, regardless of the number.



Easy Modem Setup You can use the included Apple Modem Tool to configure ASAP to work with almost any popular modem.

The applications themselves manage to get by on less than 1MB of RAM each, and the Macintosh version of each application takes up less than 250K of disk space. The receiver program can accept calls only from the ASAP sender program, which ensures the security of your network. In addition to using standard modems, you can also use alternate connection techniques, such as ISDN, AppleTalk links, and satellite feeds. After you've installed the software, setting up the connection involves simply choosing the appropriate connection tool.

Once installed, ASAP is a snap to use. You drag the file you want to send to the ASAP Sender folder and drop it in. The sender (or client) application launches, compresses the document, dials the receiver's number, and speeds the file along to its destination. The Macintosh client program compresses the files with Aladdin Systems' StuffIt; the Windows version uses PKWare's PKZip. The receiver (or server) program automatically expands received files. ASAP also offers extensive logging features in both the client and server programs, so you can easily monitor the status of the jobs that you've sent or received.

Although it supports the fast Zmodem file-transfer protocol, ASAP can't automatically resume a file transfer that's interrupted for any reason (for example, because of a line problem), but the sender does get notified that the transfer was aborted and that the file has to be sent again.

In order to put ASAP through its paces, I equipped two Power Mac 8100/80's in different cities with V.34 modems from Motorola and Supra. One served as the server, and the other, as the client. Installation and setup took just minutes. File transfers were so painless we barely noticed they were in progress, except for a status bar on screen.

My colleague and I tried hard to trip up ASAP, although without any success. Regardless of file size (or whether we were doing other work on our Power Macs), the files we sent came through in perfect condition, and transfer speeds were always quick. Once it was set up, ASAP was about as seamless as any Macintosh program can be.

The Last Word

If you need two-way transfers, you may want to consider purchasing a regular BBS program, such as SoftArc's First-Class, or something in the order of Apple Remote Access. But if you simply need a quick, convenient way for your clients to send you their files, ASAP is easy to use even for a Macintosh beginner, and its performance is first-rate. I recommend you give it serious consideration.

—GENE STEINBERG



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The Daedalus Encounter

Adventure Game

PROS: Excellent 3-D animation and integration of live action; challenging puzzles; engaging plot; can expand QuickTime movies to full screen. **CONS:** Flawed save feature; you must watch 20- to 30-second videos every time you die. **COMPANY:** Virgin Interactive Entertainment (714/833-8710). **LIST PRICE:** $59.95.

MW ★★★★

FOR FIRST-RATE CELEBRITY INTERaction on CD-ROM, nothing quite measures up to Tia Carrere (*Wayne's World*, *True Lies*) in the interactive sci-fi adventure game The Daedalus Encounter. Granted, as an actress Carrere is, well, let's just say, still learning her craft. Yet, within the cozy confines of the computer screen, she comes across as less wooden, more personable than in her movie roles. The banter between herself and costar Christian Bocher even manages a fresh and impulsive quality, as if the two actually feel comfortable together. It's not high theater, but it's fun to watch.

How do you fit into this? Well, you're this character named Casey (note the unisex name) who got blown to smithereens. Carrere and Bocher, aka war buddies Ariel and Zack, snagged your brain and stuffed it inside a robot. As a result, the interface is filled with controls wired into the fleshy lining of your robot innards; only the upper right corner of the screen is devoted to QuickTime movies that keep you apprised of the game's progress. (If you have a fast enough machine—a 68040 or better, built-in video preferable—you can expand the QuickTime movie to fill the entire screen.)

The three CDs included with The Daedalus Encounter amount to a quantum leap in design, technology, and storytelling. The texture mapping and 3-D animation are nothing short of excellent. Great pains have been taken to integrate the computer renderings with the live action—that is, Carrere, Bocher, and the stuff they're carrying. No other game—Brøderbund's Myst and Synergy's Gadget included—looks quite this good.

The plot is also unusually sound. Named after the Greek hero Daedalus, who successfully escaped a labyrinth but whose son, Icarus, perished after flying too close to the sun, The Daedalus Encounter is the story of your attempt to escape from a derelict, maze-like spaceship that's drifting aimlessly and inexorably toward the nearest sun. In addition to trying to answer the obvious question—who gets to be Icarus?—you search for a means of rerouting the ship so you don't all melt. At least, that's what *you* do. Your buddies behave like two Lois Lanes, constantly getting themselves in trouble and expecting you to bail them out. Toward the end, they just give up and take turns ridiculing your attempts to save the day. I wonder if all superheroes end up feeling as resentful as I did.

The game's programming could be tightened up. Except for the puzzles and the lengthy self-paced quest on disc three (possibly the most interesting part of the game), the action has a hurry-up-and-wait quality. After several minutes of watching a scene go by, you're expected to jump in and fix things within ten seconds or die. As you might guess, you die a lot. Thanks to a strange save function, you must typically rewatch a minute or more of QuickTime movie before you reattempt a solution. And every time you die, you have to watch one of two movies of your ship burning—which I like to call Death and Extended Death—with no means of canceling. It's enough to make the pure of heart curse like a sailor.



The Traditional Bestowing of the Croquet Balls In these frames, you see me (the probe) finding and offering a purple sphere to my good-for-nothing comrades. Zack (Bocher) openly ridicules my gift, but Ariel (Carrere) is obviously quite impressed. Her look plainly says, "Surely any probe this smart deserves my undying affections."

The Last Word

Despite these flaws, The Daedalus Encounter easily qualifies as the most exciting game I have seen this year. I've been told that some concerned parents find Zack's language to be just a tad too authentic, so this game might not be for preteens. But with live-action celebrities, top-notch animation, three levels of difficulty, and multiple possible endings, it's adult entertainment at its best.

—DEKE McCLELLAND



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Apple Mobile Message System

Remote-Messaging Service

PROS: Supports Mac, Windows, and Newton platforms; basic service includes 800 number, voice and fax mailboxes, and an Internet mail address. **CONS:** Macintosh users forced to install PowerTalk; E-mail messages changed to uppercase. **COMPANY:** Apple Computer (408/996-1010). **LIST PRICE:** $549; basic monthly service $19.95.

MW ★★★★

APPLE ENTERS THE ALPHANUMERIC paging market with a complete cross-platform hardware-software-service combo called the Apple Mobile Message System (AMMS). AMMS lets you receive alphanumeric pages on your PowerBook, Windows notebook, or Newton via an included PC Card (formerly PCMCIA card) the PageCard from Socket Communications. (Macintosh users need a 500-series PowerBook with Apple's PCMCIA expansion module.) You can originate paging messages from your computer, E-mail services, and the Internet, as well as by calling your own personal 800-number message center.

The AMMS package includes the two-line LCD display PageCard; a nice leather carrying case; software for Macintosh, Windows, and Newton; copies of Adobe's DateBook & TouchBase Pro Bundle; and crystal-clear documentation for the whole kit and caboodle.

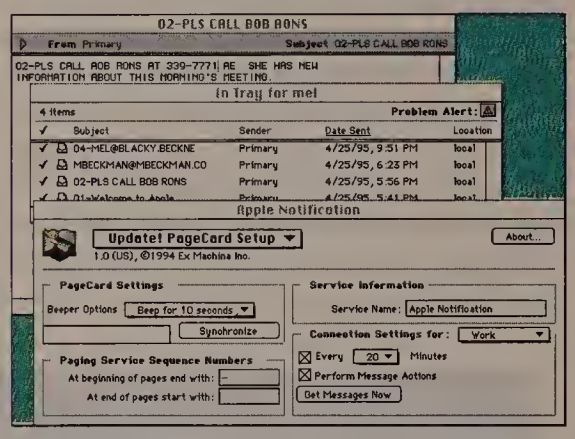
You call a toll-free number to activate the service. The basic plan costs $19.95 per month and includes a wealth of services: a personal 800 number, voice and fax mailboxes, an Internet E-mail address, and reception in the city of your choice. The basic service allows 60 messages, of up to 80 characters each, per month, with additional messages costing 25 cents each. The 800 number can take both voice and fax messages totaling up to 30 minutes per month, with additional time costing $14.95 per hour. You get automatic paged notification of new voice or fax messages, and you can print out faxes by directing them to any fax machine. To change your reception city you call a toll-free number.

Callers to your 800 number can record a message for you to replay, or leave a message with a live attendant who transcribes it to your pager for 40 cents. You can add nationwide coverage, subscriptions to news and financial information, and other features to the basic service.

The message-management software —Ex Machina's Notify and Update bundled—lets you send and receive pages. Unfortunately, Macintosh users must install System 7.5 and PowerTalk.

The PageCard receives messages continuously, showing them on its built-in LCD display and storing them in its own memory. You can carry the PageCard in your pocket and read messages on the display as they arrive. Or you can plug the card into your PowerBook's PC Card slot; then your PowerBook automatically extracts all saved messages to your PowerTalk in-box and clears the PageCard.

Sending pages requires a 2400-bps–capable modem. To send a message, you compose it in AppleMail, select one or more recipients, and press the Send button. The software automatically queues multiple messages in your PowerTalk out-box and dials into Apple's digital paging service. You can define paging groups if you want to broadcast messages to several people simultaneously.



PowerTalk-Based Apple Mobile Message System uses PowerTalk as its base of operations. You compose and read messages in AppleMail, and gateway software from Ex Machina automatically downloads messages from the PageCard.

The AMMS service also routes Internet messages to you. Each PageCard has a unique Internet address; any E-mail sent to that address is automatically transmitted to the pager. The PageCard strips down the sometimes lengthy headers on Internet messages to just the sender's name and the subject.

The product's flaws are minor. AMMS translates computer-originated messages to all uppercase, which can be irritating, and doesn't indicate when messages are truncated. And while PowerTalk nicely integrates paging with other electronic-mail services, its sophistication may be more than some users need.

The Last Word

Apple Mobile Message System is an impressive bundle of capabilities for the price. If you need mobile messaging, this deal is hard to beat.—MEL BECKMAN

Skyline/Satellite

Network-Performance Monitor

PROS: Remote traffic monitoring; extensive built-in traffic analysis; remote alarm handling with paging; AppleScript-capable. **CONS:** Expensive; requires AppleTalk routing for wide-area-network coverage. **COMPANY:** AG Group (510/937-7900). **LIST PRICE:** Single-station pack $795; five-station pack $1195; ten-station pack $1995.

MW ★★★★

MONITORING LARGE, MULtisegment Ethernet LANs (local area networks) is a difficult chore because most network monitors cannot detect traffic across the bridges and routers of WANs (wide area networks). AG Group's Skyline/Satellite 1.1 transcends this limitation by moving data collection to remote monitoring engines (Satellites) controlled by a central display-and-analysis application (Skyline).

The single-station Skyline package ($795) includes both 680X0 and Power Mac versions of the Skyline application and a 680X0 (but Power Mac–compatible) version of the Satellite program. You can buy additional Satellites for $300 each, or you can purchase packages that bundle Skyline with five ($1195) or ten ($1995) Satellite units.

In the simplest configuration both Skyline and Satellite run on a single Mac. The Satellite program commandeers the Mac's Ethernet port to observe LAN traffic around the clock, siphoning all packets transmitted over the network through the port for analysis. Satellite detects 11 network protocols—AppleTalk, NetBEUI/NetBIOS, SNA, IP, NetWare, Banyan VINES, DECnet, LAT, MOP, XNS, and OSI—tabulating network utilization, packets per second, and bits per second for each. Satellite compiles statistical snapshots of LAN traffic, which it archives to disk, and you can define the interval each snapshot summarizes—from one second to one hour.

To take advantage of Skyline's remote monitoring capability, you run a remote Satellite on one Mac in each of your Ethernet LAN segments. Satellite communicates with Skyline via AppleTalk Program Linking, so any intervening routers or WAN links must be capable of carrying AppleTalk traffic. For example, an Internet WAN requires routers that encapsulate AppleTalk in TCP/IP, such as Apple Internet Router or Cayman

continues

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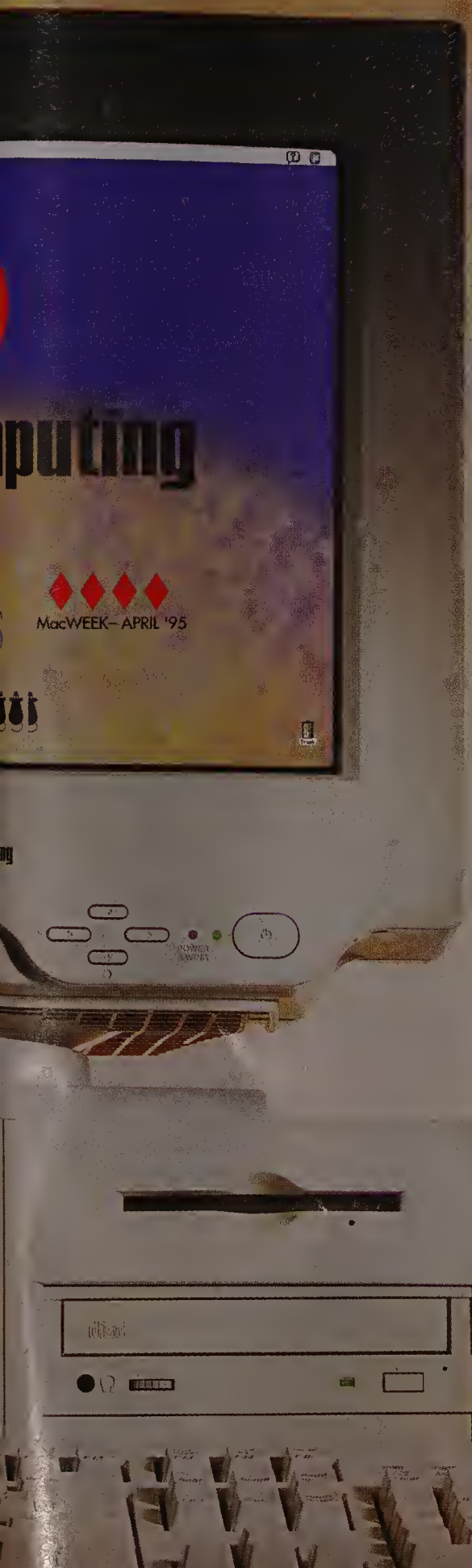
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PC users have always made excuses for sticking with a lame OS...



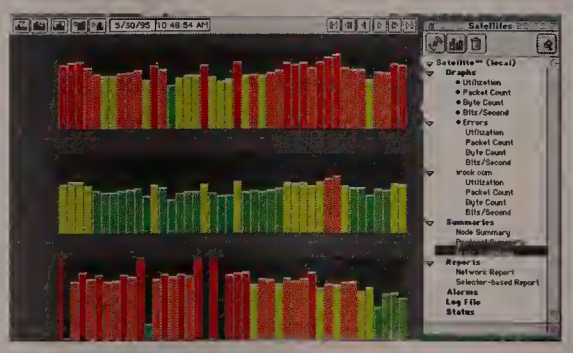
Systems' GatorBox. Because Satellite seizes a Mac's Ethernet interface for data collection, you must arrange a second AppleTalk-capable interface for communication with Skyline. That interface can be built-in LocalTalk, a second Ethernet card, or even a modem with Apple Remote Access.

Satellite doesn't require a dedicated Mac; it cohabitates nicely with other networking packages. If you want to use the remote Mac for other networking services, though, your second AppleTalk–capable interface must be Ethernet.

Satellites run independent of Skyline; you run Skyline only to analyze captured data. Upon launching, Skyline automatically locates available Satellites, retrieving network statistics from them to produce a variety of graphs and reports. You can call up bar-graph displays showing network utilization; traffic in packets, bytes, and bits per second; and error rates (see "Mission Control").

You can set alarms to trigger actions when traffic exceeds predefined thresholds. The Satellite Mac detecting the alarm can execute audible announcements, AppleScript scripts, or wireless notifications through third-party numeric or alpha pagers. Handling alarms remotely helps ensure that notifications get out, even if the connection to Skyline is broken. Skyline also provides an exceptional reporting feature based on the same criteria mechanism used for alarms. You specify traffic thresholds, and Skyline produces a report detailing time periods that match the criteria.

Skyline's user interface is intuitive. Clicking on any bar in a graph displays detailed data for that snapshot interval. Any graph can show archived data from a satellite or be updated in real time.



Mission Control Skyline displays network-performance graphs; you scroll to view historical data.

The Last Word

Skyline is a powerful tool, but at $795, the entry-level package is expensive, and deploying Skyline on a midsize (eight-segment) LAN costs about $2000. If AG provided more attractive quantity discounts and added built-in AppleTalk-through-TCP/IP tunneling, Skyline would be a five-star tool.—MEL BECKMAN

OneWorld Combo

Network Modem Server

PROS: Compact, stackable hardware; dial-out, fax, and Apple Remote Access support; centralized administration for multiple servers. **CONS:** Cannot receive faxes; no TCP/IP support; no AUI connector. **COMPANY:** Global Village Communication (408/523-1000). **LIST PRICE:** Without modems $1499, with dual PowerPort Platinum 28.8-Kbps modems $2099.

MW ★★★★

SUPPORTING MODEMS FOR MORE than a few people is expensive and time-consuming, requiring separate analog lines and modems for each user, as well as support for the various applications—fax, dial in and dial out, and Apple Remote Access (ARA)—your users require. On top of this are the security problems you face with incoming calls.

Global Village's OneWorld Combo modem server addresses this headache by letting network users share a pool of modems over LocalTalk or Ethernet LANs. Users can send (but not receive) faxes, dial out to online services such as America Online, receive dial-in data calls, and run dial-in and dial-out ARA. Each Combo unit supports up to two modems, and you can stack multiple units to build larger modem pools. The bundled software lets you centrally administer all the OneWorld Combo units on your LAN, controlling which users have access to each OneWorld service.

The OneWorld Combo server is a book-size box with two modem ports, a LocalTalk connector, and a 10BaseT Ethernet jack. (The server has no AUI or BNC connector, so if your Ethernet LAN is coaxial-based, you'll have to invest in a dual-media hub, widely available for about $150.) The package also includes Global Village's well-known Global Fax software, with a 30-user license. You can buy additional licenses at $349 for 10 users, $1499 for 50.

Global Village offers two different purchasing options for the OneWorld Combo—a fully loaded model containing two 28.8-Kbps V.34 PowerPort Platinum modems ($2099), and a base model without modems ($1499) that you can equip separately with any Global Village PowerPort modem designed to fit Apple's PowerBook 100 series. The OneWorld Combo unit I tested had two 19.2-Kbps V.terbo PowerPort/Mercury modems.

It takes only minutes to install the administration software on one Mac and the Global Fax software on each user's Mac. Configuring the server consists mostly of adding records for each user on your LAN—a simple process, since you can import your existing AppleTalk user database. You then configure the services permitted for each user by assigning passports—a list of authorizations that an administrator defines by selecting options in a dialog box. You can tailor passports to restrict access to any combination of fax services, dial-in and dial-out capability, and ARA privileges. You can also use passports to control ARA security parameters by restricting a user's access to certain AppleTalk zones, by setting expiration dates for passwords, and by disconnecting after a predefined number of failed log-on attempts.

Users send faxes through the server using the Global Fax software. Each user has a private address book, but can also share additional ones, such as a centralized corporate address book, over the network. There is no fax-receive capability, but Global Village says a free software upgrade providing this capability will be available later this summer.



STEVE HATHAWAY

Before end users can access modem dial-in and dial-out capabilities, they must perform a onetime setup procedure, selecting a modem pool via the Chooser and configuring basic interface options. Once the setup is complete, any communications program requiring a modem can use a network modem transparently.

ARA users dial in to the OneWorld server to establish an ARA session, eliminating the need to run ARA Personal Server on individual Macintoshes—a user connected to the OneWorld server has AppleTalk access to the entire LAN. If you run the Apple Internet Protocol Gateway (about $200) on your LAN, users can even access TCP/IP-based LAN services such as the Internet.

The Last Word

The OneWorld Combo transparently provides several modem services to multiple users on a LAN. When Global Village rounds out the fax support with receive capabilities, this product will truly provide one-stop shopping for modem access.—MEL BECKMAN

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Circle 86 on reader service card

PD-MCW

PhotoFix 2.8.8

Image-Editing Program

PROS: Useful feathering and transparency controls; supports masks; good printing tools. **CONS:** Some tools need refinement; no CMYK support. **COMPANY:** Microspot USA (408/253-2000). **LIST PRICE:** $249.

MW ★★★

PHOTOFIX IS A LOW-COST, UNINTIMIDATING image-editing program designed primarily for photo retouching and enhancement. At first glance, this program has lots of appeal; it offers a fairly broad range of editing tools similar to those found in Adobe Photoshop—for about $640 less. It has a few specialized features that let you output photographic images to lower-end printers with good results. And it comes with a browser application that allows you to create searchable catalogs of PICT, TIFF, EPS, GIF, QuickTime, and Photo CD images.

As a photo-enhancement utility, PhotoFix goes far beyond the basics. In addition to letting you adjust the sharpness, contrast, brightness, and color balance of images, the program allows you to feather selected areas and control their transparency, separate RGB color channels, create and load masks, and clone portions of an image using a Clone Tool similar to the one in Photoshop. While the program supports plug-in filters, it doesn't come with any, so you can't stylize images without third-party add-ons.

One of PhotoFix's real strengths is its High Quality Printing (HQP) feature. HQP optimizes images for output to lower-end ink-jet and laser printers. To use HQP, you first select your printer type in the program's Printer Settings dialog box. Next, you calibrate the program to your printer using an easy-to-follow test chart. When it's time to print your file, PhotoFix uses the printer profile to determine the brightness, contrast, and color corrections that will produce the best results. If you're printing a color image to a black-and-white printer, HQP dithers the image before sending it to the printer and lets you preview and adjust the dithered version.

You can have PhotoFix apply the HQP corrections automatically when you print, or you can override these settings and adjust the brightness, contrast, and color balance manually using slider bars. These adjustments don't affect the actual image—only the printed output.

If you're not sure which settings will produce the best output on your printer, you can use the Print Variants command, which outputs a series of thumbnail versions of your file, each with slight variations. Once you've printed the variants, you choose the thumbnail that looks best and use the brightness, contrast, or color settings printed under it.

Though the PhotoFix interface is appealing, it's weak in some areas. For example, the dialog boxes in which you edit brush size and line thickness provide no visual feedback; you can't see how thick a 37-pixel-wide brush is until you actually use it. Likewise, you can rotate selections, but only by typing a number in a dialog box. Some of the tools are hard to use, too. Making detailed selections is difficult because you can't create editable selection paths as you can in Photoshop; PhotoFix's lasso tool allows you to draw free-form selections, but you can't edit the resulting paths as Bézier curves. There's also no way to skew, slant, or resize selections.

The program comes with the PhotoFix Browser, a straightforward browsing utility that can scan a volume and index all readable files into a catalog. You can attach keywords and comments to each entry and search for images by name, keyword, type, or size. Overall, it's a passable image-management tool, but more limited than some; it has a 150-image size limit, for example, and it doesn't allow you to reorder images.

The Last Word

PhotoFix costs more than bare-bones photo-enhancement utilities such as Apple PhotoFlash, but it does a lot more than brighten and sharpen pictures. It's a genuine—albeit limited—image-editing program that's more than adequate for even mildly sophisticated image doctoring. It needs refinement, but the program's modest price and its ability to optimize printing on low-end printers make it a useful tool.—JOSEPH SCHORR

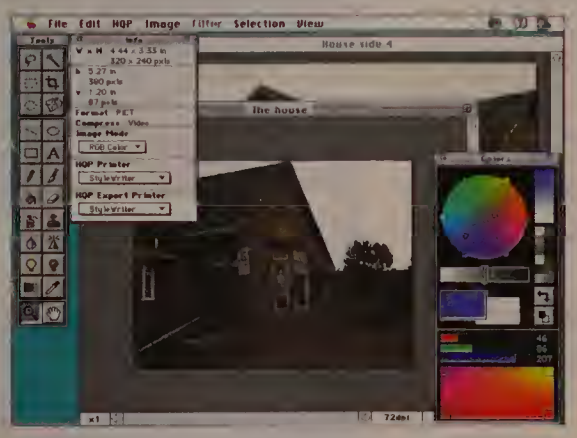


Photo Fixing PhotoFix provides a full palette of Photoshop-like tools for doctoring your images. The elegantly designed Colors palette makes it easy to create, mix, and save new colors.

ultraSecure 3.524

Security Software

PROS: Comprehensive set of protection tools; relatively nonintrusive in day-to-day use; fairly easy setup. **CONS:** Not compatible with driver-level compression, background disk-scanning, or software-partition programs; cannot install over network. **COMPANY:** usrEZ Software (714/756-5140). **LIST PRICE:** $239.

MW ★★★

IF YOU HAVE FILES TO KEEP from prying eyes, you'll want to consider security software. ultraSecure from usrEZ Software has as comprehensive a set of security features as I've ever seen in a single package.

The program comes on a single disk. You activate ultraSecure by launching the Administrator program and creating an installation script that specifies the protection options you want. Protecting a large network can be time-consuming, however. ultraSecure doesn't support network installations, so you have to perform a separate installation on each Mac you want to protect. However, the publisher's newly announced ultraCommand software is designed to address these network limitations and to provide network-level software-distribution capability.

The program offers five levels of user access, including master administrator, administrator, supervisor, user, and guest. You can protect any or all of the disks connected to a Mac, including removable media. Once you protect a disk, you can restrict access to specific files and folders based on such criteria as the user's authority level and the workgroup to which the user belongs.

In addition to its regular protection features, ultraSecure provides three different methods for encrypting files. These include usrEZ's proprietary encryption algorithm, the U.S. Government Data Encryption Standard (DES), and Triple DES.

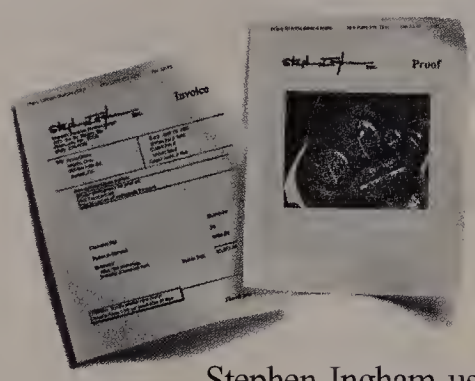
The program offers a full set of logging features that record all attempts to access and use a protected disk. You can limit a user password to a specified number of accesses; when the password reaches its limit it becomes inactive. ultraSecure can automatically log off a user after a specified period of time or when the user activates a certain mouse command. You can set a built-in screen saver to come on after a specified interval.

continues

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Stephen Ingham uses only the latest digital tools, including electronic cameras coupled to PowerMacs, storing high-resolution images on drive arrays — no place for an old-fashioned fax machine. But you'll find Delrina Fax is right for your business too, offering features no fax machine can match. And if you already own a fax modem and want to upgrade, rest easy. Delrina Fax supports most Class 1 and Class 2 fax modems, as well as the Apple Express Modem™ and GeoPort Telecom™ adapter.

Still unsure? Delrina Fax has a hassle-free, 60-day, money-back guarantee. Plus *Macworld* magazine says, "Furthermore if you do run into trouble, Delrina's phone-help staff is jaw-droppingly good." (October 1994)

To order Delrina Fax PRO for Macintosh, call 1-800-631-8118. Or visit your local software retailer.



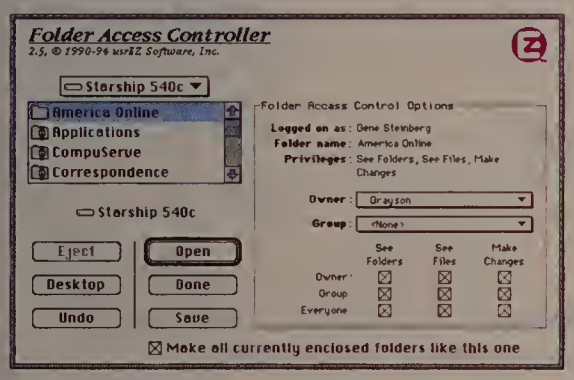
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Circle 137 on reader service card

The program provides a back door, known as ultraKey, to let you access a Mac if you've forgotten the password. ultraKey creates a file for each protected Mac; you should store this file on a floppy and put it in a safe place to prevent unauthorized access. If the password is lost or forgotten, the floppy can be used as a master key to unlock the drive. If you don't have an ultraKey and forget your password, you're out of luck; you have to reformat the drive.

ultraSecure has an almost bewildering set of features, and I've only touched the highlights here. But it's not terribly hard to use. Most menu-bar commands and dialog boxes are clearly labeled as to function. To get the most out of the program, though, you'll want to read the manual thoroughly.



Looks Like File Sharing The Folder Access Controller desk accessory allows you to restrict access to certain parts of your hard disk.

There are some drawbacks to ultraSecure. As with other security software, driver-level compression programs are a no-no. But the list of unsupported procedures doesn't stop there. You cannot use a software disk-partition program, such as Symantec's Norton Partition. The background disk-diagnosis features of such programs as Symantec's MacTools Pro must be turned off. Also, you cannot update or reinstall system software without first disabling ultraSecure.

In other respects, the program works well and intrudes little upon one's regular work, and the publisher seems to be dedicated to resolving bugs as they are discovered. During the review process, I encountered some minor problems with Apple's Control Strip and General Controls under System 7.5 and 7.5.1. These were promptly fixed in the 3.524 update.

The Last Word

Despite its trade-offs, ultraSecure offers just about every security trick one can imagine in a single product, and the program will be a boon to any business that needs to protect valuable document files and software. Anyone interested in security software should give it careful consideration.—GENE STEINBERG

Nikon Coolprint

Dye-Sublimation Printer

PROS: Fast. **CONS:** Supports only A6 paper; low resolution; poor color matching. **COMPANY:** Nikon Electronic Imaging (516/547-4355).
LIST PRICE: $2350.

MW ★★

MW LAB THE NIKON COOLPRINT NP-10 IS A color dye-sublimation printer designed to deliver output quickly from digital cameras—like the Apple QuickTake or the Nikon E2—to give you the digital equivalent of a Polaroid system. Designed for people like photo-lab operators and professional photographers who need quick color proofs of their digital images, the Coolprint is built for speed, but its speed has trade-offs: small paper size, low resolution, and poor color matching.

Excellent Speed

The major reason for considering the Coolprint is its quick printout speed. Because the Coolprint offers low resolution and a small print area, the printer doesn't have to process a huge amount of data. The printer also connects to a Mac via the faster SCSI port (rather than the serial or the AppleTalk port), which boosts data-transfer speed. The Coolprint uses the host CPU to render images, so printing speed depends on your computer's horsepower. (Nikon recommends a minimum of 4MB of RAM on your computer, though 8MB is more realistic.)

The Coolprint is one of the fastest dye-sublimation printers I have seen—a 142-dpi A6-size image took less than 90 seconds to print using my Quadra 650. The printer's built-in single-image buffer also streamlines printing multiple copies; you can quickly print additional copies with the push of a button on the Coolprint's front panel.

The Coolprint supports only the A6 paper size—3.9 by 5.5 inches, with an actual print area of only 3.4 by 4.5 inches. The A6 format is suited for proofs of Photo CD pictures, scanned images, and simple illustrations, but the small paper size makes the Coolprint unsuitable for much else.

As with most dye-sublimation printers, the consumables are expensive compared with other media such as thermal-wax paper and ribbon. Nikon's standard paper package includes 100 sheets of paper and one ribbon cartridge and lists for $97.20—about the same as what other vendors are asking for A6-size consumables. Postcards and adhesive labels are also available in packages of 50 sheets for $72.80 and include a ribbon cartridge.

Poor Image Quality

To test the Coolprint's print quality, I printed a set of images used by Macworld Lab to evaluate color printers. As with any dye-sublimation printer, the Coolprint's printouts are more pleasing to the eye than those from either ink-jet or thermal-wax transfer printers. However, the Coolprint offers only 142-dpi resolution, which yielded some jagged edges in the images. The low resolution is most apparent in text superimposed on a photo; despite a built-in antialiasing feature, the Coolprint still produced text that was noticeably jagged at normal viewing distance—it takes more than antialiasing to overcome low resolution.

Although jagged edges may be forgiven in a printer designed to produce proofs, it's hard to overlook the Coolprint's poor color matching. Though the Coolprint supports Apple ColorSync, and though Nikon bundles its own proprietary color-management software, the printouts did not match my Matchprint acceptably. Printouts also appear slightly washed out within about ⅛ inch of the top edge (the problem is especially pronounced on output with darker colors). It is difficult to use the Coolprint for proofing when the printouts don't adequately mirror your image's colors.

The Last Word

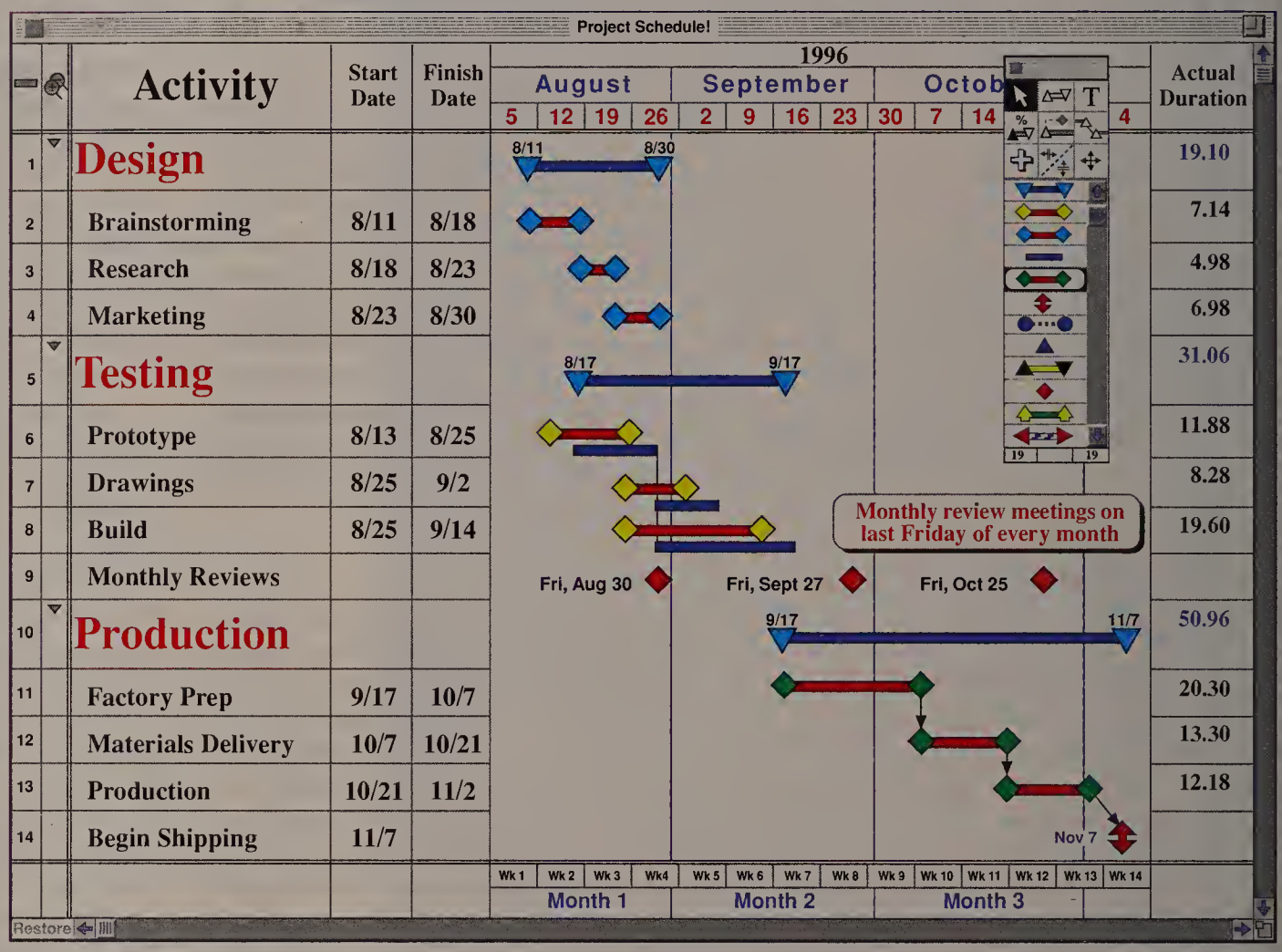
At $2350, the Nikon Coolprint is too expensive for the poor color matching, low resolution, and single paper size it offers. If you need color accuracy, paper format options, and higher resolution for quality proofs, consider the less expensive and more versatile (though much slower) PrimeraPro dye-sublimation and thermal-wax printer from Fargo Electronics (see *Reviews*, January 1995, and "Color Printers Mean Business" in this issue). But if you need quick proofs that don't require color accuracy, the Nikon Coolprint merits a trial.—MARK HURLOW



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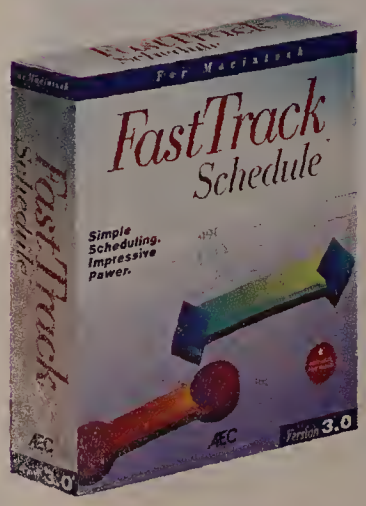
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ChoiceStick 1.0.2

Dual-Joystick Port

PROS: Supports three- and six-button controllers from Sega Genesis and others; preconfigured for 140 games; flexible, easy-to-use software. **CONS:** Difficult to test and restore game settings; no printed manual; cannot set a default controller type. **COMPANY:** Kernel Productions (302/456-3026). **LIST PRICE:** $69.95.

MW ★★★

TO THE DISMAY OF GAME PLAYERS, the Mac doesn't come with a joystick port. Now, though, the ChoiceStick—a dual-joystick port for the Mac—lets you connect a pair of three- or six-button Sega Genesis, Sega Master System, Atari 2600, Atari 7800, or 3DO controllers to any Mac except the 128K, 512K, or Plus. And with a Genesis four-player adapter, you can connect up to four controllers.

The tiny ChoiceStick box—about 4 by 3 by 1 inches—connects to any ADB port. Because the box includes two ADB sockets, you can connect it in series with your keyboard and mouse. On the front of the box are two ports to which you attach the controllers.

For the most part, the ChoiceStick software (three extensions and a control panel) is a pleasure to use. It comes preconfigured for 140 games; you can use the settings as is or edit them to your liking. You can also configure the ChoiceStick to work with other programs.

To configure or reconfigure a game, you either open the ChoiceStick software's control panel or press a hot key while the game is running. You can assign a mouse movement, a mouse-click, or a keystroke to every button and direction on the controller.

For many games, this assignment process is simple—even fun. However, games that allow free movement may require many adjustments before you get things right. Unfortunately, the ChoiceStick software does not allow you to test new settings without saving them over the current ones. And there is no command for restoring or reverting to the original settings.

You can also use the ChoiceStick software to control programs other than games. You can assign controller buttons to close windows and issue Copy or Paste commands, for instance.

In addition to the standard configuration options, the ChoiceStick works with games that take complete control of your Mac and lets you set advanced movement options, including gravity, desktop friction, mouse tracking mode, and edge settings. For most games, these features can be ignored. Still, it's nice to know they're around if you do need them. Another ChoiceStick plus is that if a controller fails, you can get a new one for $15 to $20; joysticks that plug into the ADB port are rare and more costly to replace.

Most of the problems I had with the ChoiceStick can be traced to the manual. The documentation—provided only as a DocMaker file—needs more-thorough explanations.

The software has some shortcomings. The control panel needs an import command, and there should be a simple way to test new settings without overwriting existing ones. Since the two bundled controllers are both six-button models, the ChoiceStick programmers configured all games for a six-button controller. However, three-button controllers are more common, so a better approach would be to let players set the default controller type via a preferences setting.



RICHARD RETHEMEYER

Some games are better suited for joypads and joysticks than others, and some of those work better with a joystick. Pinball and action-adventure games are naturals for a joypad. But playing Pac-Man with a joypad was difficult, while a joystick worked beautifully.

The Last Word

With some additions to the manual and a few software adjustments, the ChoiceStick could be a world-class solution to the Macintosh joystick problem. The base package includes the device, an ADB cable, and the software. For an additional $10 or $20, you can get an Asciiware six-button Genesis joypad or joystick. Given the small increment in price, I recommend the bundle.—STEVE SCHWARTZ

FloorPlan Plus 1.1

2-D CAD Software

PROS: Affordable; easy hardware requirements; good basic drafting tools. **CONS:** Limited object-positioning tools; unusual text handling; undisciplined zooming. **COMPANY:** Computer-Easy International (602/829-9614). **LIST PRICE:** $49.95.

MW ★★

FLOORPLAN PLUS IS A DRAW PROgram designed to be used by nonprofessionals for rudimentary 2-D drafting. Simply constructed and affordable, FloorPlan Plus is intended for architectural and interior-design chores around the home or in a small business—for example, seeing the effects of moving the furniture around, or brainstorming the configuration of a new den or patio.

FloorPlan Plus provides standard tools for drawing lines and geometric shapes, and it offers basic CAD features, including a tool that builds wall objects to user-defined thicknesses. Another tool draws wires, pipes, and conduits, and a third produces pattern-filled shapes representing building or landscaping materials. The program recognizes the patterns created by the tools and, by calculating the dimensions of these objects, can produce bill-of-materials summaries for construction planning.

Other quasi-CAD features include object libraries. FloorPlan Plus comes with libraries containing window and door elements, furniture, landscaping objects, and general architectural symbols, such as those for electrical outlets and wall switches. And the program offers a basic dimensioning capability that lets you apply labels with measurements denoting the size of an object (such as a wall length) or the distance between objects (for, say, the width of an aisle).

FloorPlan Plus lets you create scale drawings that range in size up to 105,625 square feet (325 by 325 feet) at 1/16-inch resolution, and to over 27 million square feet at 1-inch resolution. The program provides a grid to aid in positioning objects, and you can use up to 16 layers for organizing drawing elements.

FloorPlan Plus is easy on hardware requirements. A single 800K floppy disk holds the uncompressed program, the tutorial files, and the four object libraries. The software runs on all Macintoshes from the Plus to Power Macs. (Yes, I tested it on my heirloom Mac Plus.)

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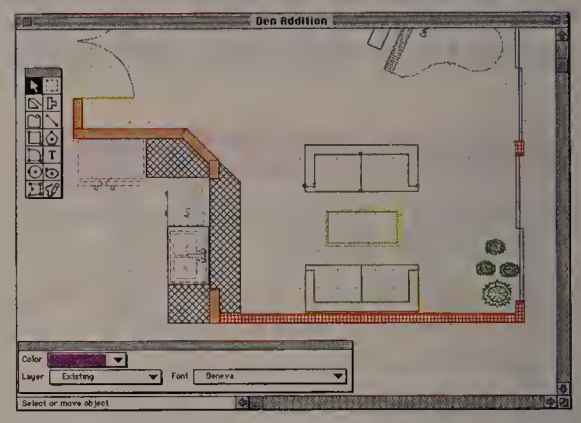
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Circle 7 on reader service card



Bargain Planning FloorPlan Plus offers basic drafting tools at an affordable price.

It's hard to criticize a program with a street price around $35, but in practice FloorPlan Plus leaves a lot to be desired. For example, it supports only 16 colors. More significant is the omission of rulers, which leaves you with no visual reference for either the drawing's size, or its working scale. Consequently it's easy to get lost moving around a plan: zoom in to position an object, and you can't tell which grid line is which. With a small project—say a 20-by-20-foot room—the problem is annoying but manageable. But if you plan to push the program to its limits, be prepared for some pain.

FloorPlan Plus's interface looks very Mac-like, but start working with it, and its foibles become clear. For example, you can edit objects by moving individual control handles, but the command terminates if you miss a handle. Each miss requires a return to the Edit menu.

The program's text handling is poorly implemented. Instead of offering the standard options, the program sizes text relative to the drawing scale—for example, "one drawing foot" size. Use the wrong size and you must return to the text or measurement-label dialog box. Choosing another size has no effect on selected text; you must redo the notation.

And FloorPlan Plus zooms to its own drummer. Even when objects are selected, a zoom-in can send you to a completely different part of the drawing, forcing you to scroll to where you want to go. Since the program is no speed burner (surprising, given its small size), scrolling gets tedious—even on a Power Mac.

Finally, FloorPlan's short manual does only a fair job, and some users may find the instances of non-Mac terminology confusing.

The Last Word

FloorPlan Plus is a bare-bones draw program with basic CAD features. Large projects are out of its league, but it's acceptable for small drafting chores. Of course, that's if you can live with its modus operandi, but at this price you can put up with a lot.—CARLOS DOMINGO MARTINEZ

MOUSE? TRACKBALL?

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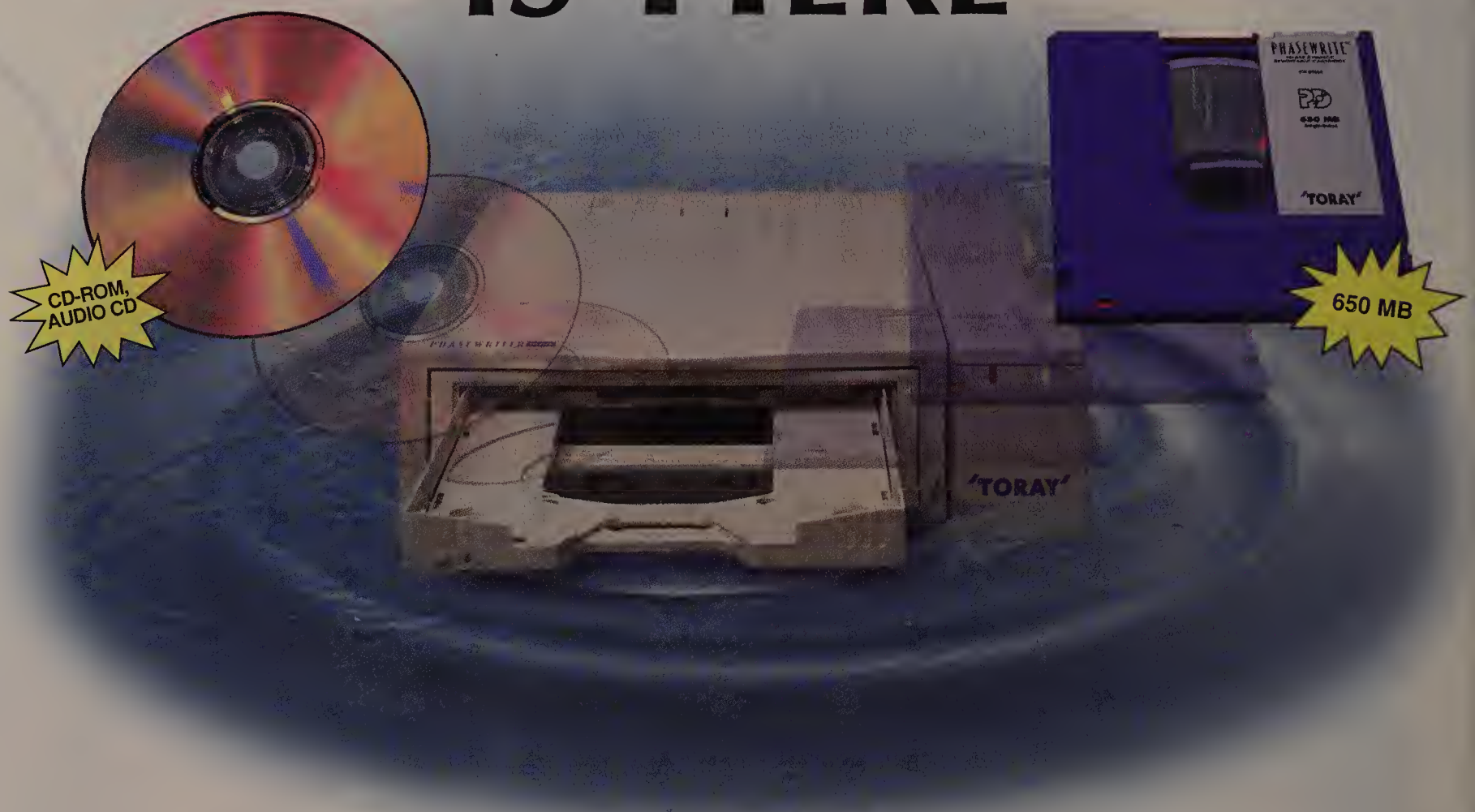
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InstantReplay 1.0

QuickTime Screen Recorder

PROS: Straightforward; easy to use; versatile file-conversion features. **CONS:** Manual needs more details and an index. **COMPANY:** Strata (801/628-5218). **LIST PRICE:** $149.

MW ★★★★

STRATA BILLS INSTANTREPLAY AS A screen recorder: a program that enables you to create QuickTime movies of screen activity. While InstantReplay excels at this task, it also does a half-dozen other things extremely well. In fact, it's one of the most versatile multimedia utilities I've ever used.

InstantReplay has two components: a system extension and an application. The extension lets InstantReplay record screen activity when you press a hot-key combination. The application lets you specify capture settings and convert a variety of file formats into QuickTime movies.

Before recording, you can specify the size of the capture area. You can record a full-screen movie, but larger movies require more disk space and may not play back smoothly. It's generally better to use a smaller size. If you're recording a long mouse journey—such as dragging an icon across the screen—Follow Cursor causes InstantReplay to pan as the mouse moves.

InstantReplay lacks the ability to shrink the Mac's display area to 512 by 384 pixels. But this shortcoming isn't significant—on most Macs, the Monitors control panel lets you specify a 512-by-384-pixel screen size. Doing so lets you record movies that appear full-screen but, when played, don't fill a 14-inch monitor, thus leaving room for navigation buttons.

InstantReplay can record audio while recording screen movies. InstantReplay can also record conventional QuickTime movies on any Mac equipped with video-digitizing hardware.

When you stop recording, InstantReplay opens the movie. The program provides some useful editing commands that let you delete unwanted portions of a movie or paste a clip into an existing movie. Some of the most valuable commands are tucked beneath option-shift key sequences, however, and you might miss them if you don't read the manual, which barely defines them.

If all InstantReplay did was record and let you edit screen and video movies, it'd be a winner. But its file-conversion features make a good thing even better. The program can import and create QuickTime movies from CD audio tracks, MPEG movies, PICS files, AIFF audio files, System 7 sound files, MIDI files, and even text-only files. You can also export movie frames as PICT or PICS files and movie sound tracks as AIFF files.



Framing the Scene The lower-right corner of this screen contains a movie recorded with InstantReplay. In the upper-right corner, you can see the resizable frame that indicates what portion of the screen InstantReplay will capture. Also shown: InstantReplay's Import submenu.

The Last Word InstantReplay's screen-recording features make it a must-have for anyone producing Mac training materials. But its ability to record video QuickTime movies and convert all major multimedia file formats gives InstantReplay a much broader audience. If you're involved in QuickTime movie production—especially with projects involving a variety of file formats—you need this program.—JIM HEID

The Fuzzy Logic Toolbox 1.0

Math-Simulation Software

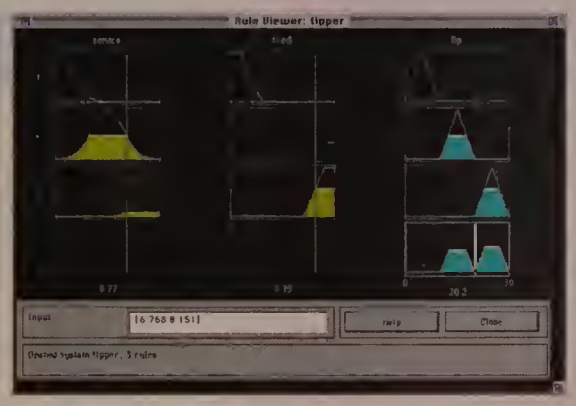
PROS: Nice graphical interface management; integrates with MATLAB's Simulink. **CONS:** Slow in Mamdani mode; engineers-only price. **COMPANY:** MathWorks (508/653-1415). **LIST PRICE:** $895.

MW ★★★★

MATHWORKS' FUZZY LOGIC TOOLbox is a complete, easy-to-use graphical interface for constructing models using fuzzy logic. In traditional two-valued logic, a set of true/false inputs are evaluated, through a series of rules, to a true/false output. Fuzzy logic evaluates partially true inputs and produces an output within a range of values. Although many other multi-valued-logical approaches, from neural networks to systems of linear equations, get results roughly equivalent to fuzzy logic formally, fuzzy has emerged as a favorite among engineers who have to design real-world chip-based systems.

The Fuzzy Logic Toolbox (FLT) is designed to use MATLAB ($1695) to develop models, but it can also construct stand-alone applications that use an included fuzzy-logic inference engine, and FLT exports a standard ASCII specification of fuzzy-logic models for use in other programming systems. FLT offers both the languagelike E. Mamdani inference method and the more recent, significantly faster, but more abstract Sugeno method, as well as adaptive neuro Sugeno-based systems (in which input functions "learn" from input data), and fuzzy clustering for pattern recognition. These methods cover nearly the whole range of current academic and industrial research options in fuzzy logic. And having MATLAB as a base allows extension and modification of the original MathWorks toolbox routines to implement any other techniques you want to use.

Beyond a comprehensive set of fuzzy-programming routines, FLT includes numerous examples of adaptive-control systems and data classifications (many of these are greatly enhanced by the Simulink graphical systems display). The examples are particularly useful for showing you how to scale up from creating simple, diagram-based systems to assembling complex applications that are code-based MATLAB M-files. The tutorial in the manual has the simple but profound virtue of being the best introduction to fuzzy systems ever written, since it offers a detailed guide to examples in FLT, and was clearly produced with control-systems engineers, rather than mathematicians, in mind (engineers have to understand fuzzy logic and make something work, rather than resolve the numerous philosophical issues surrounding fuzzy).



The Rules of Fuzz The Fuzzy Logic Toolbox's rules-viewing window is interactive. In this screen you can confirm that the outputs (tips) correspond to the inputs (service and food).

The Last Word The Fuzzy Logic Toolbox is an introduction to fuzzy control systems for professionals, many of whom will already be familiar with MATLAB toolboxes for signal processing and different types of traditional control (state-space, robust, and m-analysis, among others). If you have any interest in these topics, FLT is clearly the product to buy.
—CHARLES SEITER

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Trackball Pro ADB

Input Device

PROS: Ball fits snugly and rolls smoothly; button functions can be customized.
CONS: Limited cursor-acceleration control; buttons can't be programmed to send text strings. **COMPANY:** CH Products (619/598-2518). **LIST PRICE:** $119.95.

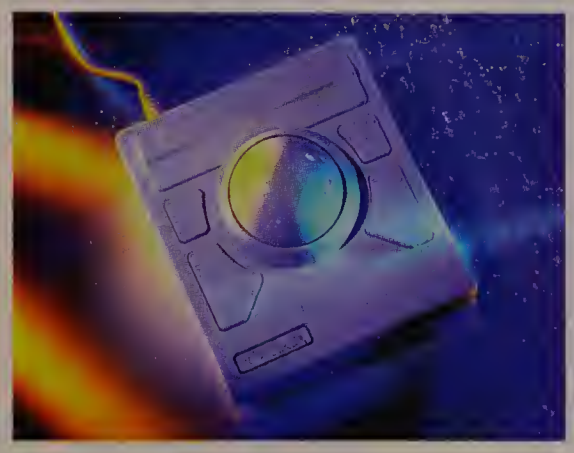
MW ★★★

TO RATE CH PRODUCTS' TRACKBALL Pro ADB, I compared it with Kensington Microware's Turbo Mouse 4.0 (see *Reviews*, *Macworld*, November 1992), since the two input devices are almost identical in size and shape. The Trackball Pro has a cord, hardwired to its case, which connects to an ADB port via a pass-through plug that allows you to hook up another ADB device in series, an approach I find vulnerable to accidental separation. (The Turbo Mouse, by contrast, reduces this risk by using twin ADB ports, one for its own removable cord and one for connecting another device.) The Trackball Pro's ball is fixed in place by a flange that holds it snugly while permitting the ball to roll smoothly.

The Trackball Pro has four buttons (two more than the Turbo Mouse) located in pairs on each side of the ball, but only two are easily accessed by thumb and forefinger without lifting your hand from the ball; you have to press the others with your ring or pinkie finger, which I find awkward. The Trackball Pro's buttons provide less tactile and auditory feedback than do the buttons on the Turbo Mouse; however, the control panel lets you swap the functions of the two sets of buttons, to accommodate both right- and left-handed users.

The Trackball Pro control panel lets you customize the function of each button individually. You can set any button to click, click-lock, or double-click when you press it. You can also program it to generate single keystrokes (with or without modifier keys such as ⌘ and option), but you can't use a button to send strings of text (like your name and address) as you can with the Kensington Turbo Mouse.

CH Products' approach to customizing cursor response is also less comprehensive than Kensington's. For example, the Trackball Pro control panel lets you specify normal and slow cursor speeds by means of slider controls, but it doesn't provide the fine control you get with the Turbo Mouse software, which allows you to define custom cursor-acceleration tables. Finally, the Trackball Pro doesn't offer anything resembling Kensington's Brilliant Cursor function, which jumps the cursor to a user-defined on-screen HotSpot whenever you move the cursor toward that spot—very useful for people with large monitors.



SCOTT PETERSON

The Last Word Although the two trackballs are about even on ergonomics, the Trackball Pro isn't as programmable as the Turbo Mouse. The Turbo Mouse provides a two-year warranty, which beats the Trackball Pro's one-year warranty, and Kensington's printed manual is more lucid than the electronic guide that comes with the Trackball Pro. Overall, Kensington's Turbo Mouse provides more functionality than the Trackball Pro, but if you don't care about the missing functions, the Trackball Pro ADB, which lists for about $50 less, is worth a look.—FRANKLIN TESSLER

Gear 2.5

CD-Recordable Software

PROS: Speedy file conversion; saves hard disk space by converting files on the fly; good documentation; very good technical support.
CONS: Cannot record HFS CD-ROMs from just a portion of a hard drive; can't manipulate order of files in recording window. **COMPANY:** Elektroson (610/617-0850). **LIST PRICE:** $799.

MW ★★★

CD-RECORDABLE MASTERing software doesn't just move digital data from a storage device to a CD-ROM; it must also convert that data from the 8-bit values of hard drives into the modulated 14-bit values of CD-ROMs. This conversion usually requires saving a copy of the translated material to a computer's hard drive before transferring it to the actual CD-ROM. Elektroson's Gear can bypass this storage-consuming step (for most CD-ROM formats) through its virtual-image feature, which allows you to convert files on the fly while recording to the CD-R drive.

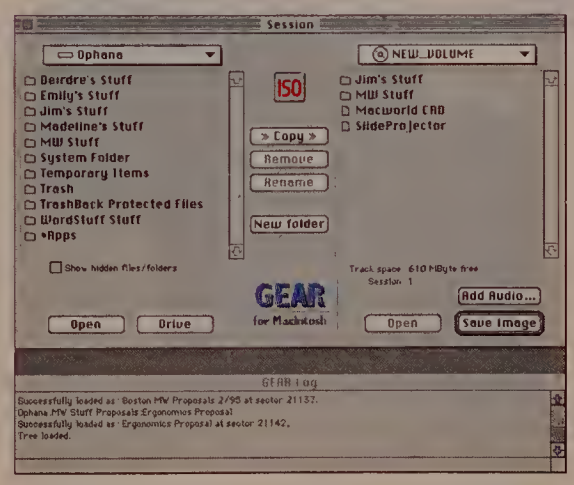
Gear features a familiar highlight-and-click interface. Your drives, folders, and files appear in a window on the left of Gear's screen. You highlight the items you want to record and then click on the Copy button, which queues them in the recording window on the right (see "Familiar Windows"). Unfortunately, Gear doesn't allow you to manipulate the order of files once they're queued in the recording window.

Gear supports standard CD formats such as multisession, ISO 9660, HFS, Photo CD, hybrid, and audio. You can also save data to tape in the Disc Description Protocol format (DDP) preferred by some CD-ROM–pressing services.

Unfortunately, Gear creates HFS-format CD-ROMs (supporting Macintosh file names, icons, and deep directories) only from an entire hard drive or partition, not from individual files. Elektroson sends registered users of Gear a copy of FWB's Hard Disk ToolKit, which provides a soft-partition feature to work around this obstacle, but using ToolKit requires another planning step. Elektroson needs to integrate a soft-partition feature within Gear—as Astarte does with its CD-R mastering program Toast—to facilitate recording in the HFS format.

The 93-page manual explains Gear's functions and CD-R technology effectively, and Elektroson provides very good technical support for any questions not covered by the manual. The appendix explains all of the program's error codes—a nice touch missing in some other products—but the manual needs to provide more information on how to solve the problems that cause the errors. Beginners and occasional users would also benefit from more step-by-step instructions on how to build CDs in different formats.

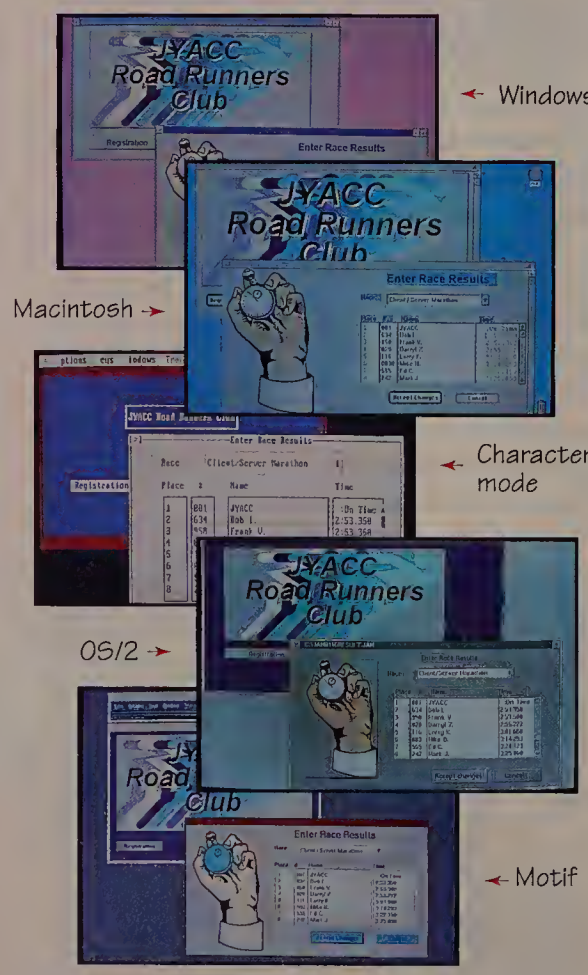
The Last Word Gear 2.5 is as good as Astarte's Toast (see "Desktop CD-ROM Publishing," *Macworld*, March 1995). Joined with an AV-friendly 1GB hard drive, Gear works predictably and reliably, making it a good tool for Macintosh professionals planning to record one or more CDs per week.—JIM FEELEY



Familiar Windows Gear uses a simple highlight-and-click interface to build a CD-ROM. The log displays all actions that Gear performs.



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On Cue II Utilities 3.0

Desktop-Utility Package

PROS: Provides quick access to files and folders; enhanced open-file dialog box. **CONS:** Find function cannot search for embedded text; limited extension-manager functions. **COMPANY:** ComputerEasy International (602/829-9614). **LIST PRICE:** $99.95.

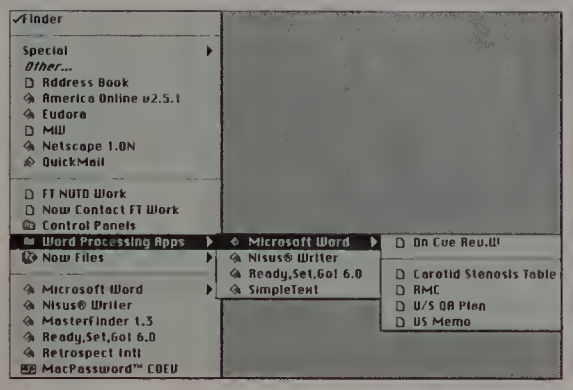
MW ★★★

ON CUE II UTILITIES 3.0 IS THE LATEST incarnation of a utility that garnered a strong following when it first appeared a few years ago but has since lost ground to competitors like Now Utilities 5.0 (see *Reviews*, *Macworld*, January 1995). On Cue consists of eight modules, each of which adds a different set of functions to the Mac Operating System. An installer program lets you load as many modules as you like, with a complete installation requiring about 1MB of disk space. On Cue works with System 7.0 or higher and is Power Mac–compatible.

On Cue II's centerpiece is a file launcher, called On Cue Menu, that lets you open applications and documents by selecting them from a menu located at the upper left or right corner of the screen (see "Files on Cue"). (Another module, KeyLauncher, lets you locate and open any file by typing the first few characters of its name.) You can group related items in folders, and attach documents to specific applications in the menu. You can also define groups of items, called MultiSets, that automatically open at the same time when you choose a MultiSet from the menu.

Another useful module, Smart Open, enlarges the Mac's standard open-file dialog box. The enhanced version shows the name, type, creator, size, and modification date of all items in the current folder or disk. Icons at the bottom of the window let you search for, get information about, duplicate, or delete files and folders. If you're technically inclined, you can even change a file's type, creator, and Finder flags, and set access privileges for shared disks and folders. (A desk accessory called On Disk provides an alternate way to access all of Smart Open's tools.) Unfortunately, Smart Open lacks the ability to search by content; Now Utilities' Now SuperBoomerang can.

On Cue II Utilities' remaining components are less compelling. On Task facilitates switching between running applications, and OnTheLevel lets you specify sound and monitor settings for particular applications. An extension manager called On Startup lets you control which extensions and control panels load at start-up, but it can't ferret out INIT conflicts the way Casady & Greene's Conflict Catcher can (see *Reviews*, October 1994). Finally, QuickFinder displays a list of all files with a specified file type and/or creator.



Files on Cue On Cue Menu's hierarchical menu lets you access frequently used documents.

The Last Word Configuring utilities like On Cue II can be daunting for first-time users. Fortunately, the manual is lucid and complete, despite a few misplaced references to DOS in the opening pages. While it's not nearly as comprehensive as Now Utilities, On Cue II offers several useful functions and may be a bit less intimidating for some people.—FRANKLIN TESSLER

In Control for Workgroups 3.5

Project Planner and Scheduler

PROS: Easy, flexible sharing of project and calendar data. **CONS:** No document-level security features. **COMPANY:** Attain (617/776-1110). **LIST PRICE:** $149.95; ten-pack $949.95.

MW ★★★★

IN CONTROL FOR WORKGROUPS 3.5 lets you share In Control 3.0's excellent multicolumn outliner, to-do, and calendar features (see *Reviews*, October 1994) over a network. In Control's main feature is the outliner, which adds multiple columns to the familiar indented outline format. For example, every outline topic has columns for a description, start date and time, and end date and time (and of course, you can add more columns). The date-and-time columns link the outline and In Control's built-in calendar; you can use the outline to list to-do items and then schedule those items on the calendar.

You can choose to share one or more columns in your outline, then pick which line items in the column are to be shared. You can also select which coworkers have access to your data, or share different parts of the data with different coworkers. For example, if you maintain a shared personnel list, you could limit access to the Salary column to department managers, and you could restrict access so that a manager could see only his or her department.

In Control does not have a server application that arbitrates data transfer between users; rather, users periodically connect to an intermediary file, called a Public File, on a shared network volume via AppleShare, System 7 file sharing, or NetWare. The Public File contains a copy of the shared data stored in each user's local file on the user's hard drive. To share data, a user opens an In Control file and selects Use Public File from the Public Files submenu in the File menu. Data in a local file can be updated with information from the Public File at user-definable intervals, or immediately, using the Update button in the tool bar. Shared data is indicated by a vertical bar near the start of each outline row.

Because the Public File does not need to be constantly accessed, PowerBook users can add or modify information on the road and still reconcile their data with that of the other users at the next connection to the Public File, either directly over the network or through Apple Remote Access.



Transmitted Tasks It's easy to spot shared data in your outline by the vertical lines next to the bullets that start each row.

In Control for Workgroups has no document-level security features, so any user can change any shared data; users should have the ability to lock selected items so that changes cannot be made. Another problem is that users aren't automatically alerted if columns have been added to a Public File.

The Last Word Many projects (and managers) need more tracking and brainstorming tools than multiuser calendar programs offer, yet don't need a full-fledged project manager. In Control for Workgroups is a good solution for workgroups that need to share project information. The flexible outline allows managers to view as much or as little of a project as needed, while the integrated calendar lets you easily track a project's progress.—TOM NEGRINO

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Jetstick

Macintosh ADB Joystick

PROS: Preconfigured for 120 games; easy to update, import, and export settings; one-year warranty. **CONS:** Inadequate manual; system crashes if you attempt to configure games that are running; can interfere with mouse operation; no button labels. **COMPANY:** CH Products (619/598-2518). **LIST PRICE:** $74.95.

MW ★★

THE JETSTICK IS A JOYSTICK THAT plugs into an ADB port. (If you have only one ADB port, you can use the pass-through port on the Jetstick's cord to connect it in series with your mouse and keyboard.) The Jetstick features a comfortable pistol-style handgrip, two firing buttons, separate trim wheels for the *x* and *y* axes, and a properly weighted base.

The Jetstick control panel enables you to view or change settings for games, other programs, and the Finder. The control panel contains settings for 120 games—you can store up to 200. To activate a setting you open the control panel, find the game in the settings list, click the Automatic Load check box, and close the control panel. When you launch the game, the Jetstick is enabled. You can also choose a sound that plays when the game is launched to indicate that the Jetstick is active.

You can view and change settings, and associate each joystick direction and button with a keystroke or a mouse-click. Every program must use one of three modes. In Absolute and Relative Mouse modes, joystick movements replace mouse movements. In Keyboard mode, movements are controlled from the keyboard. Options include flipping the *x* or *y* axis or swapping the axes, setting the speed at which the cursor moves in relation to joystick movement, and setting the size of the active cursor area.

The included settings worked flawlessly. Using the control panel, however, can sometimes be challenging. When you select a game, its settings go into effect immediately. And choosing a program that is configured for an unusual-size screen or that uses Absolute Mouse mode can make the cursor jump erratically.

Although I couldn't get the Jetstick to work with Microsoft Flight Simulator 4.0a, most of my other problems were caused by the documentation. The Jetstick ships with a printed manual, a photocopied update, and several Read Me files. This material explains how each control-panel option works, but a tutorial would have been helpful. Also, some very basic information was omitted. For instance, the manual doesn't mention when you can safely use the control panel. It's natural to want to check or tweak settings while a game is running. However, this frequently resulted in a crash.



GIBSON

The Last Word Although I like the Jetstick hardware, the manual and the software forced me to do more work than necessary. Currently, the ChoiceStick dual-joystick port from Kernel Productions is a stronger choice (see review this issue). The ChoiceStick's price is about the same, the software has more options, and you can reconfigure games and check settings while games are running.—STEVE SCHWARTZ

Menu Master Mac

Security Software

PROS: Easy to register several users; toll-free technical support. **CONS:** Can't restrict log-on to particular days or times; no limitation on disk space usage; encryption not compatible with all hard drives. **COMPANY:** Electronic Learning Systems (904/375-0558). **LIST PRICE:** $99; 15-site license $299.

MW ★★★

MENU MASTER MAC 2.5.0.7 ELIMINATES some of the worry when you're sharing a Macintosh—or a roomful of Macs—by allowing an administrator to protect and budget a computer's resources. The administrator can restrict a user's access to specific files, folders, and applications; prevent users from inserting a floppy disk or launching a file from a CD-ROM; and limit them to a specified number of log-on minutes or printed pages per day (see "Restricted Access"). The manual provides step-by-step instructions for configuring Menu Master on AppleShare networks, and if you run into a snag, technical support is helpful and toll-free.

The administrator of a shared computer registers users by accessing the administrator's account and entering a password-protected management mode. You can add users manually, or import them automatically from a tab-delimited text file—a time-saver if you have many users to process. You set access privileges by navigating dialog boxes to select the files, folders, and applications you want to make available, and Menu Master lets you set access privileges for several users at once by assigning them to groups.

You can also assign each user a personal folder for saving files and provide separate read-only and drop (write-only) folders for any user or group—handy for distributing and receiving documents.

Menu Master protects the Mac by replacing the Finder with an interface that lets users access only those files, folders, and applications specified by the administrator. (You can authorize use of the Finder by giving users the management password, effectively making them fellow administrators.) Menu Master greets a user with a log-on screen demanding a name and password. After log-on, Menu Master displays the accessible files and folders as icons in windows similar to the Finder's. A user can launch applications or access files and folders by clicking on the icons.

Menu Master suffers from a couple of omissions: you can't restrict usage to particular days or hours, nor can you limit the hard drive space allotted for a user's personal folder.

The Last Word The acid test of any security system is the degree of protection it provides, and Menu Master easily thwarts the usual workarounds, including starting up from another volume or disabling extension loading at start-up. For added security, the installer disk contains a program that encrypts all the files on your hard disks, but it's incompatible with many third-party drives. Despite its limitations, Menu Master is a good solution for computer labs and other installations where Macs are shared.—FRANKLIN TESSLER



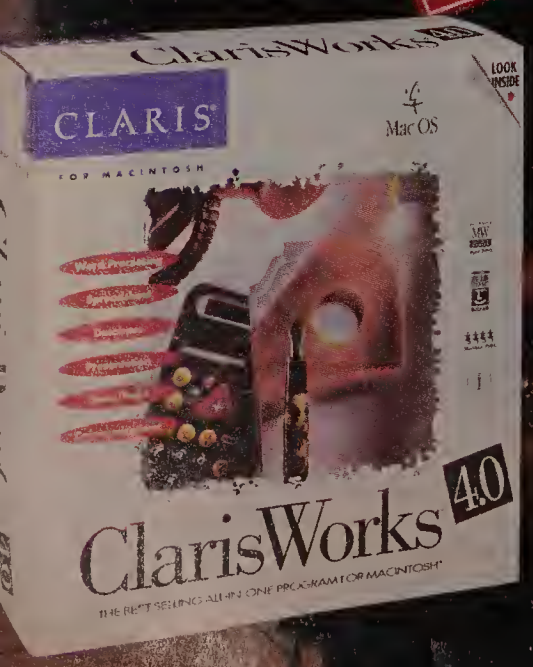
Restricted Access Menu Master's Finder-like interface limits access to specified items. A floating window shows the remaining log-on minutes and printer pages available.

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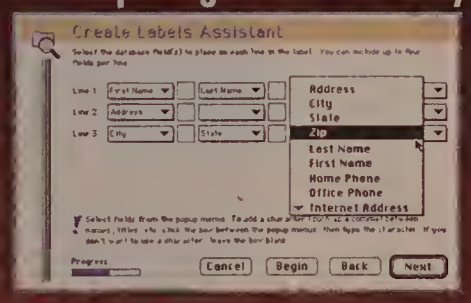
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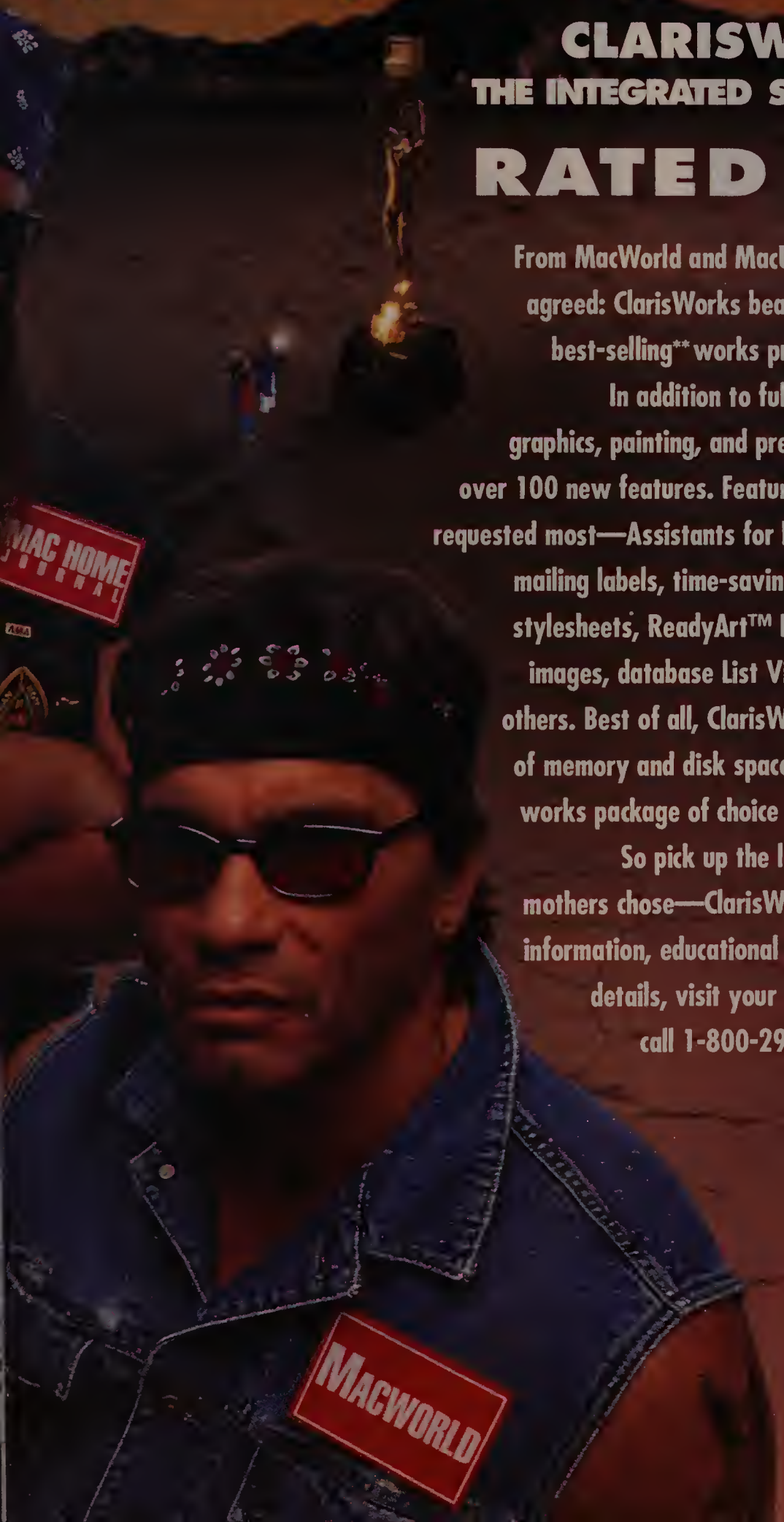
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Digital cameras hav

Some top filmless devices, clockwise from upper left: Dicomed's Digital Camera, Fuji's Fujix DS-515 (comarketed by Nikon as the E2s), and Apple's QuickTake 150.

FILMLESS

gun to challenge traditional film units

WONDERS

Many futurists predict that silver-based film and conventional photography will soon go the way of 8-track stereo and polyester leisure suits. After all, once you buy a filmless camera, you never pay an-

by Daniel Grotta
and Sally Wiener Grotta

other nickel for film or processing, or worry about polluting the environment with dangerous chemicals. Just hook up the camera to a Mac and color printer, and you have a veritable home Fotomat. And filmless cameras are fast and convenient; they can produce a picture in minutes, or instantly transmit images anywhere in the world. Filmless photography is rapidly becoming popular among law enforcement officials, photo ID centers, photojournalists, real estate listing agencies, and insurance claims adjusters.

But don't throw away that trusty conventional camera yet. Filmless devices (cameras and camera backs) still cost many times more than comparable-quality film-based counterparts. It would take most users quite a while to shoot enough exposures to save money. And limitations in shooting flexibility, storage capacity, and image quality still dog filmless photography.

At the heart of every filmless camera is a photosensitive semiconductor called a charge-coupled device, or CCD (see the diagram "Filmless Photo Dilemma: Speed versus Resolution"). The performance and cost of CCDs—and by extension filmless cameras—varies widely. In evaluating filmless cameras, we found that relatively inexpensive ones—the $739 Apple QuickTake 150, the $795 Dycam Model 4, the $3200 Fujix DS-100, and the $3740 Canon RC-570—typically produce images comparable to those shot with a $20 box camera. Midrange handheld cameras, such as the $10,995 Kodak DCS420 and the $16,020 Fujix DS-515 (identical to the Nikon E2s Digital Camera System), deliver image quality analogous to that of a $100 point-and-shoot 35mm camera. Even the most expensive portable filmless camera, with the highest-grade CCD we worked with, the $27,995 Kodak DCS460, has approximately the image quality of an $800 semiprofessional 35mm camera. And while filmless devices designed for studio use—like the $4995 Leaf Lumina, the $29,995 Leaf Digital Camera Back, and the $22,500 Dicomed Digital Camera—produce superb images that can be enlarged to poster or even billboard size, these cameras must generally be used with a tripod; most must be tethered to a computer; and others require long exposure times, precluding live action (see the table "Filmless Photography Spectrum").

To test the talents of these devices, we photographed a still-life scene that presented various technical challenges—including a range of colors, subtle and varied highlight and shadow detail, and a variety of textures and reflective surfaces. We used strobe lights for the real-time cameras and high-intensity fluorescent lights for the time exposures required by the studio devices.

The crucial measure of any camera's performance is output. We used three output media: print, electronic display, and

film (see the sample output "More Data Equals Higher Quality"). All images were transferred as TIFF files to Bernoulli cartridges, printed to a Fuji Pictography 3000 (a photo-quality printer), output to slides on a Management Graphics Solitaire Image Recorder, and viewed in Adobe Photoshop 3.0 on a high-resolution monitor. To level the playing field, we used the cameras' own defaults when possible. Bear in mind that images can usually be improved with retouching software.

Entry-Level Cameras

The least expensive filmless devices are simple point-and-shoot cameras with fixed lenses, built-in strobes, few user-selectable controls, and only fair image resolution. As a result, they can't handle true wide-angle or telephoto shots, minute detail, output to slides, or enlargements bigger than 4 by 5 inches. Low-end devices work well for viewing photos on screen or for newsletter-type publishing. Their relative affordability, compact size, lightweight design, modest computer requirements (8MB of RAM, compared with the 24MB to 64MB some of the higher-end cameras require), and ease of use make point-and-shoot cameras well suited for hobbyists and business users.

The Apple QuickTake 150 (tested in a prerelease version, but now available) is virtually identical to its groundbreaking predecessor, the 100, but with a few important refinements: twice the internal storage capacity, a snap-on close-up lens, and a built-in infrared filter that sharpens images. The 150 also ships with a simple image–touch-up program, PhotoFlash.

The 150 is virtually foolproof: just slide open the lens cover, aim, and shoot. The camera automatically adjusts exposure to match lighting conditions. The 150's fixed-focus lens has a depth of field from 4 inches to infinity. The snap-on macro lens allows close-ups (10 to 14 inches), but the viewer is very difficult to focus. Off-loading images is easy—attach the camera to a modem or printer port, open PhotoFlash, and click on the thumbnail you want to move to your hard drive. The QuickTake 150's only significant limitation, aside from the mediocre image quality of all inexpensive filmless cameras, is its frame buffer. It holds only 16 to 32 shots (depending on resolution) that must then be either off-loaded.

We looked at a prerelease version of Kodak's $995 DC40, but it is now shipping. The DC40 uses the same CCD as the QuickTake, and both cameras' bodies are built by Chinon. There are several important differences, however. The DC40 comes equipped with 4MB of flash RAM, enough to hold 48 standard or 96 low-resolution images. To compensate for less RAM (the QuickTake has 1MB of flash EPROM), Apple masks part of the CCD to limit resolution to 640 by 480 pixels. The DC40 uses the full CCD for a resolution of 756 by 504. That translates into sharper, more-detailed images—which should be well worth the extra $256.

The Dycam Model 4 comes with a $99 optional lens that focuses down to 2.5 inches and is designed to produce sharper images, but our evaluation showed no appreciable improvement over the fixed-focus lens. With no LCD display panel, the camera beeps when it's ready to shoot (up to once every 8 seconds

Filmless Photo Dilemma: Speed versus Resolution

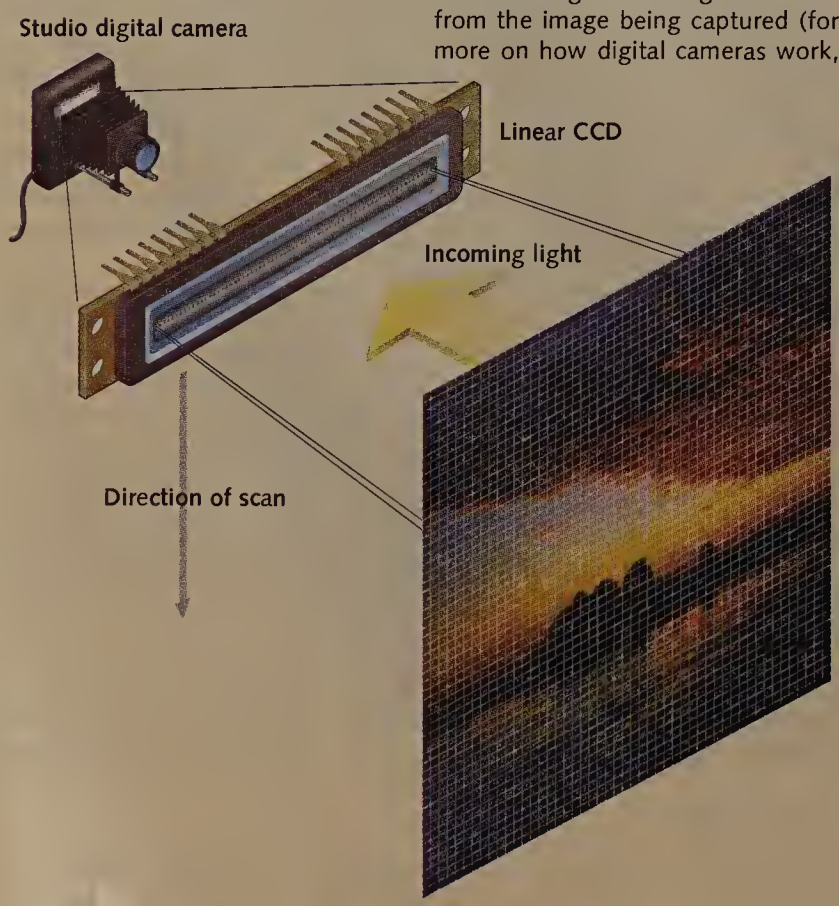
CCDs Turn Light into Data

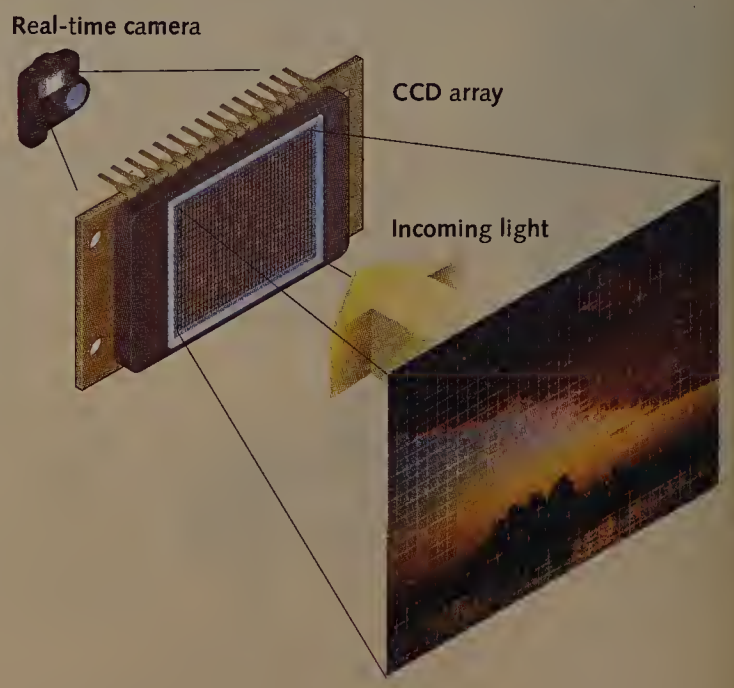
The cameras reviewed in this article take photos without film. Their image-capture medium is a specialized semiconductor—called a charge-coupled device (CCD)—composed of hundreds, sometimes thousands, of separate photosensitive elements. CCDs transform light into electrical charges whose intensities vary based on the strength of the light reflected from the image being captured (for more on how digital cameras work, see *Macworld*, September 1994, page 142). The CCD passes these charges to an analog-to-digital converter that codes the light data for storage in RAM or on a hard drive.

CCDs Come in Two Main Types

In a **studio digital camera**, a **linear CCD**—a single row of photosensitive elements—captures an image as a series of narrow strips. This technique offers high resolution, but takes time. You can't use linear CCDs to photograph moving subjects; nor can you shoot subjects that can't withstand a slow exposure under bright, hot studio lights.

In **real-time cameras**, a **CCD array** exposes an entire grid of photosensitive elements at once. CCD arrays rival normal photographic film in image-capture speed, but CCD arrays create images with much lower resolution than do film or linear CCDs. (To produce an array with as many physical elements as a linear CCD can create virtually—through strip-by-strip exposures—would be prohibitively expensive.)





in standard resolution) or when the frame buffer is full. The camera stores only 8 standard or 24 low-resolution frames.

The Dycam was the only camera we tested that has no automatic exposure control. For outdoor shooting, Dycam provides a neutral-density filter to avoid overexposure. That's acceptable for cheap box cameras, but not for a nearly $800 device. Off-loading images was simple, but changing defaults (resolution, flash on/off, and shutter speed) has to be done through your Mac—a terrible flaw for a camera meant to be used on the go.

Significant differences separate the Dycam and the QuickTake. Both save to built-in memory chips. However, the QuickTake's low-powered flash EPROM chips keep the pictures intact for up to a year, while the Dycam's power-hungry RAM chip stores images for only a week. Theoretically, the Dycam's etched viewfinder with parallax-correcting guides (which reduce the discrepancy between what you see in the viewfinder and what the camera captures) should be more accurate than the QuickTake's simple unframed viewfinder. But the Dycam was so inaccurate that it took us ten exposures to guesstimate where to center the camera to shoot our still life.

The Model 4's biggest difference is image quality—a resolution problem sets it behind the other devices. The QuickTake's 640 by 480 resolution is enough to give a sharp screen image and decent prints up to 4 by 5 inches. But with the Dycam's 496 by 365 resolution, even with corrected software the screen image would probably be less sharp, as would prints larger than about 3 by 4 inches.

Slightly pricier, slightly better Moving up a notch in price, the Canon RC-570 adds an autofocus zoom lens, a parallax-correcting optical viewfinder, 1-frame-per-second (fps) shooting speed, and virtually unlimited storage capacity. After you've clicked off 25 standard- or 50 low-resolution images, it takes only seconds to swap out the camera's $10, 2-inch floppy and continue shooting.

Technically, the RC-570 is an analog-type still-video camera, rather than a digital camera. Digital cameras instantly convert images from analog to digital data; still-video cameras need expensive boards or boxes to produce their digital data. Still-video cameras generally yield poorer image quality at the same resolutions as digital cameras. The RC-570's prints were not sharply defined and the colors shifted. However, still-video cameras offer the advantage of being able to instantly output a standard video-broadcast signal to a TV, VCR, or color video printer.

The RC-570 really falls down on price. The basic system (camera, digitizer board or box, and software) costs $6000 or more—for image quality roughly equal to that of the $739 QuickTake.

The Fujix DS-100, which with all necessary equipment resides in the RS-570's price range, has a push-button autofocus zoom lens and through-the-lens viewing. This camera features a true macro lens that can focus as close as 1.6 inches, several flash modes, manual-exposure compensation, optional remote control, a video-signal port, and the ability to time-stamp frames. These features make it well suited to scientific and medical applications. It focuses quickly and flawlessly at every zoom magnification.

Filters Turn Light into Colors

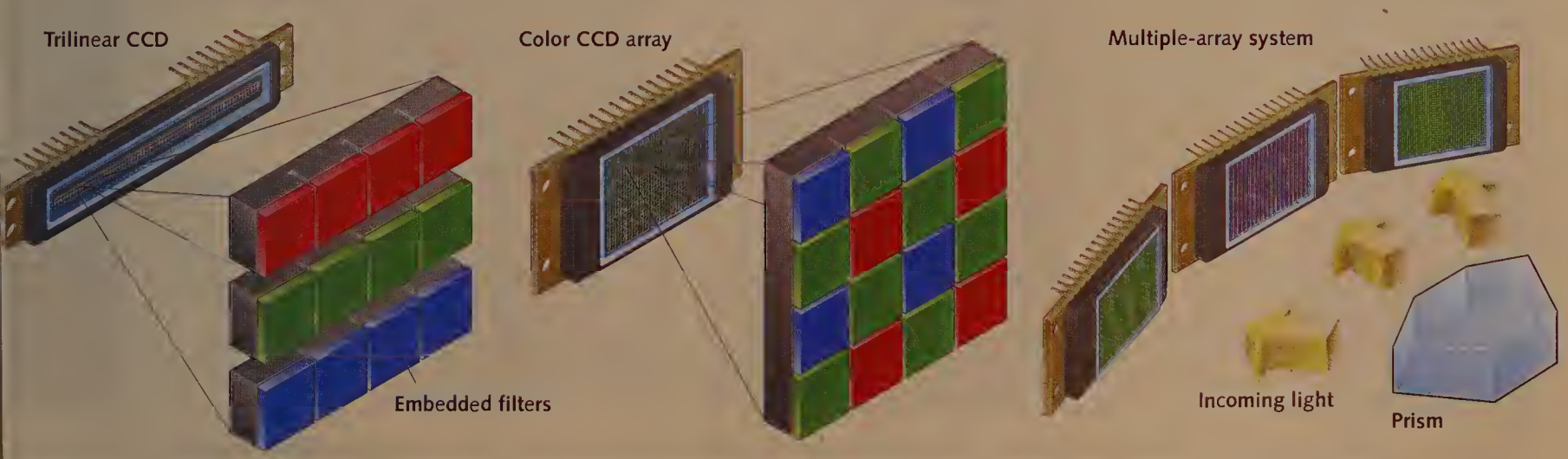
For a filmless camera to capture color, incoming light must pass through color filters before reaching the CCD. One way to handle filtration is to make separate exposures through three filters—each impedes one of the primary colors that make up a color digital image. (The Leaf Digital Camera Back uses this method.) This technique produces good image quality, but it's slow. And some linear CCDs have difficulty registering the three images.

Three Embedded-Filter Solutions

Some digital studio cameras, such as the Dicomed Digital Camera, use **embedded filters**. Three rows of filters sit directly on top of the photosensitive elements. Each filter row of this **trilinear CCD** blocks a different primary color. The CCD captures all three colors in one pass, thereby eliminating the registration problems found in three-pass linear CCD systems.

Real-time cameras use **color CCD arrays** with embedded filters arranged in a pattern, as in the Kodak DCS460. Each photosensitive element captures just one of the primary colors. For each pixel of an image, the camera must then interpolate from nearby elements to get the other two colors. This method permits instant exposure but reduces resolution.

To get better resolution, real-time cameras can use a **multiple-array system**. A **prism** directs light from the image source onto two or three arrays, which have various embedded-pattern schemes for filtering the primary colors (the Sony CatsEye uses this method). The information from each array is combined to create one color image whose resolution equals that of images captured with a single monochrome array. A multiple-array system can't capture images in rapid succession, however. The data from just one shot fills the RAM buffer, and you must offload the buffer before shooting again.



Filmless Photography Spectrum

Company	Product	Phone, Toll-Free Phone	Evaluated for This Article	List Price/ Company's Estimated Street Price [A]	Resolution/ File Size	Bits per Color Channel
Cameras						
Apple Computer	QuickTake 150	408/996-1010, 800/776-2333	yes [B]	$739/$690	640 × 480/300K–900K	8
Associated Press	News Camera 2000	none, 800/697-2537	no	$15,500/NP	1280 × 1024/3.75MB	12
Canon USA	EOS-DCS 3	516/488-6700, 800/828-4040	no	$16,000/NP	1268 × 1012/3.67MB	12
	RC-360		no	$2600/$2210	632 × 458/873K	8
	RC-570		yes	$3740 [D]/$3200	632 × 458/873K	8
Dycam	Model 4	818/407-3960, 800/883-9226	yes [B]	$795/NP	496 × 365/530K	8
Eastman Kodak	DC40	716/724-4000, 800/235-6325	yes [B]	$995/$895	756 × 504/1.1MB	8
	DCS420		yes	$10,995 [D]/ $9500–$10,000	1524 × 1012/4.5MB	12
	DCS460		yes	$27,995 [D]/NP	3060 × 2036/18MB	12
	EOSDCS 5		no	$11,995/$10,200	1524 × 1012/4.5MB	12
The Focal Point	PentaCam VSC/3000	203/226-2638, 800/736-8211	no	$23,000/$17,900 [G]	768 × 494/900K	8
Fuji Photo Film U.S.A.	Fujix DS-100	914/789-8100 800/378-3854	yes	$3200 [D]/$2600	640 × 480/900K	8
	Fujix DS-505 [I]		no	$12,780/NP	1280 × 1000/3.66MB	8
	Fujix DS-515 [I]		yes	$16,020 [D]/$13,000	1280 × 1000/3.66MB	8
	Fujix HC-1000		no	$32,000/NP	1280 × 960/3.52MB	8
Leaf Systems	Lumina	508/460-8300, 800/685-9462	yes	$4995 [L]/$4500	2700 × 3400/26.1MB	12
Nikon	E2 Digital Camera System [I]	516/547-4355, 800/526-4566	no	$12,780/NP	1280 × 1000/3.66MB	8
	E2s Digital Camera System [I]		yes	$16,020 [D]/NP	1280 × 1000/3.66MB	8
Sony Electronics	DKC-5000 CatsEye Digital Camera	201/930-7796, 800/472-7669	yes	$15,100 [D]/NP	1520 × 1144/5.2MB	10
	MVC-7000		no	$8450/NP	768 × 494/1.2MB	8
Camera Backs						
Dicomed	Digital Camera [M]	612/895-3000, 800/888-7979	yes	$22,500/$22,500	6000 × 7520/900K	12
Eastman Kodak	DCS465	716/724-4000, 800/235-6325	no	$27,995/NP	3060 × 2036/18MB	12
Leaf Systems	CatchLight [N]	508/460-8300, 800/685-9462	no	$34,995/ $32,000–$33,000	2048 × 2048/12MB–24MB	14
	Digital Camera Back [N]		yes	$29,995/ $27,000–$28,000	2048 × 2048/12MB–24MB	14
Phase One United States	PB series	516/757-0400, 800/972-9909	no	$19,135–$23,470/NP	4000 × 4000–5000 × 7142 [O]/45.8MB–102.2MB [O]	12
	StudioKit series		no	$10,999–$12,990 [P]/NP	2500 × 2700/≤25MB	12
Rollei FotoTechnic	ChipPack	201/808-9010	no	$28,000 [Q]/NP	2048 × 2048/12MB	12
	Digital ScanPack [R]		no	$32,920 [Q]/NP	5850 × 5000/≤90MB	10

[A] Actual prices may be higher or lower than estimated street price provided by company. NP = not provided by company. [B] Prerelease version evaluated. [C] On 170MB memory card. after. [G] Direct sales price. [H] Video camera with frame grabber. [I] Fujix DS-505 and DS-515 are identical to Nikon E2 and E2s, respectively. [J] On 15MB memory card. [K] For seven images; adapter for Mamiya RB67 and RZ67. [N] Fits Mamiya RZ67 and certain Sinar, Cambo, and Hasselblad cameras. [O] Varies according to camera type used. [P] Includes two studio lights, NuBus

Storage Type/Capacity (number of images)	Computer Interface	Exposure Plus Reset Time (in seconds)	Output (digital/video)	Portable or Studio
1MB flash EPROM/16–32	serial	3–7	yes/no	portable
PC Type III/135 [C]	SCSI	<1, offers burst mode	yes/no	portable
PC Type I, II, or III/75 [C]	SCSI	1, offers burst mode	yes/no	portable
2" analog floppy/50	frame-grabber board, 2" analog disc drive	1	no/yes	portable
2" analog floppy/25–50	frame-grabber board, 2" analog disc drive	1	no/yes	portable
RAM chip/8–24	serial	8	yes/no	portable
RAM/48–96	serial	9	yes/no	portable
PC Type III/110 [C]	SCSI	1 [F]	yes/no	portable
PC Type III/27 [C]	SCSI	12	yes/no	portable
PC Type III/110 [C]	SCSI	1 [G]	yes/no	portable
optional external Hi8, Betacam, or ½" VCR recorder; hard drive/NA	9-pin D-sub connector, third-party frame-grabber board	NA [H]	yes/yes	portable
proprietary S-RAM card/5–21	DP-100 external SCSI card processor	1	yes/yes	portable
PC Type I or II/5–84 [J]	PC-card drive, serial port	1 [K]	yes/yes	portable
NA/NA	SCSI	14	yes/yes	studio
NA/NA	SCSI-2	48–180	yes/yes	studio
PC Type II/5–84 [J]	PC-card drive, serial port	<1 [K]	yes/yes	portable
PC Type I or II/5–84 [J]	PC-card drive, serial port	1 [K]	yes/yes	portable
NA/NA	SCSI-2	1	yes/yes	studio
2 disks/25–50	frame-grabber board, 2" analog disc drive, video out	1	no/yes	portable
1GB external hard drive/7–500	dual SCSI-2, serial interface for camera control	10	yes/no	both
PCMCIA Type III/27 [C]	SCSI	12	yes/no	both
NA/NA	proprietary high-speed serial	2.7	yes/no	studio
NA/NA	proprietary high-speed serial	30	yes/no	studio
NA/NA	SCSI	30–540	yes/no	studio
NA/NA	NuBus board	90–195	yes/no	studio
NA/NA	SCSI	30	yes/no	both
NA/NA	SCSI	≤720	yes/no	studio

[D] Extra-cost features required. [E] For first images; 3 seconds per image thereafter. [F] For ten images; 3 seconds per image thereafter approximately 10-second wait for seven more images. [L] Includes 50mm macro lens. [M] Fits any 4-by-5-inch view camera, interface card. [Q] Includes camera body and one lens. [R] For specific Rollei models.

But the DS-100's memory card system leaves a lot to be desired. Like the Canon RC-570, the DS-100 saves images to a removable storage medium that you can swap in a matter of seconds. The RC-570 saves up to 25 high-resolution or 50 standard images on a floppy, while the Fujix stores only 5 to 21 digital images (depending on compression level) on $360 proprietary 1MB memory cards. What's more, the DS-100 requires a dedicated card drive that costs about $2500.

Expensive Real-Time Cameras

For the next jump up we looked at real-time systems costing between $11,000 and $28,000 that incorporate professional features, like auto-aperture or shutter-priority modes, manual shutter speeds and f-stops, fully interchangeable lenses, the ability to annotate each frame verbally via built-in microphones, burst modes (the ability to fire off several frames in quick succession) as fast as 3 fps, spot or matrix metering, various lighting settings, and precise exposure-compensation control. All real-time cameras use either removable PC (formerly called PCMCIA) Type III cards, or Type I or II solid-state flash-memory cards, and off-load their images via TWAIN-compliant Photoshop plug-in drivers. (The $850 Fujix CR-500 PC Card Reader reads from and writes to Type I, II, and III PC cards.)

Neither small nor light, high-end, real-time cameras are twice as large and two to three times as heavy as conventional 35mm cameras. These cameras are well suited for photojournalism; sports; annual reports; some portraiture, industrial, and manufacturing photography; and for specialized work requiring immediate viewing, short deadlines, or the rapid electronic transmission of images.

The Kodak DCS460 is the highest-resolution portable filmless camera on the market. Virtually all the controls and features are the same as on the conventional Nikon N90 body that the DCS460 is based on, with two important exceptions. The ISO, or film-equivalent sensitivity level of the CCD, is limited to a range of 50 to 200. This diminishes the DCS460's suitability for shooting candid photos with available light. The DCS460 also lacks a burst mode. The camera pauses for 12 seconds between frames to save the image file to the camera's 170MB removable hard drive. That, in photographic parlance, is half a lifetime. Another frustrating bottleneck: the three to four minutes it takes to off-load each image (unless you use a SCSI-2 accelerator board). As this article went to press, Kodak began shipping a new driver that it says greatly

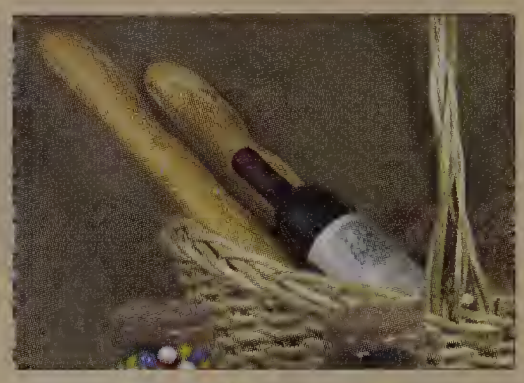
More Data Equals Higher Quality

The quality of images captured by filmless devices depends largely on the amount of visual information the devices can capture. Less expensive cameras capture less information—resulting in smaller file sizes—than professional-level units. The less data captured (and consequently, the smaller the file size), the smaller the image that can be printed clearly at the same resolution as an image captured by a better camera.

This series of images shows the effects of different amounts of visual information on image size. (These images are not intended for direct comparison of image quality because lighting and other conditions varied during the photo shoot.) On the far left, a 630K image created with a $3740 Canon RC-570 is printed as large as possible while offering full resolution at 300 dpi. (This is a crop of a larger image. For lower-resolution



Canon RC-570, 630K



Fujix DS-515, 1.6MB



Kodak DCS460, 8.5MB

speeds off-loading of images for all its filmless units (except the DC40), as well as for the Canon EOS-DCS3 and the Associated Press News Camera 2000.

But the DCS460's image quality sets it apart. It's the only real-time camera that can produce photographs up to 11 by 14 inches that are virtually indistinguishable from those made with 35mm film. This quality doesn't come cheap; it costs $27,995 (not including lens).

The DCS420 is identical to the DCS460, except the 420 uses a smaller, lower-resolution CCD, which effectively reduces the lens's focal length (and viewing area) by about half and lowers the camera's cost by nearly $17,000. But the 420 has a conventional camera-like burst mode of better than 2 fps, for 5 successive frames. The 420 also records more frames before you must off-load images or swap hard drives. The 420's uncompressed file size (4.5MB) is one-fourth that of the 460 (18MB); transferring each 420 image to the computer takes about 50 seconds. Because of its handling capabilities, shooting speed, and recording capacity, the DCS420—of all the cameras tested—feels and works the most like a conventional 35mm camera.

In a similar price range, the Fujix DS-515 (also sold as the Nikon E2) is a complicated camera to learn and to use; the sheer number and complexity of controls on the DS-515 are enough to daunt even photographic wire-heads. But perseverance has its payoff: total control, more download options, a high degree of customization, and excellent image quality.

The DS-515 uses a novel optical condenser in which the image area fills the entire viewfinder. This means that, unlike with the DCS420, a 50mm lens on the DS-515 gives a 50mm field of coverage. Unfortunately, the largest aperture is a modest f/6.7, regardless of how fast the lens. To compensate, the camera's ISO goes up to 1600, fast enough for most available-light photography. The DS-515 comes equipped with a video interface for off-loading images to TVs, VCRs, or video printers. And images are quickly and easily transferred to the computer via a PC Card.

The $15,100 Sony CatsEye Digital Camera is a hybrid. This still-video camera shoots in real time like portable filmless cameras, but lacks an internal power supply, a viewfinder, on-camera controls, or built-in storage capability—relegating it to the studio. It is the only camera we tested that uses three CCDs instead of one, reducing color aliasing while boosting image resolution.

While the camera is difficult to set up, shooting is fast and easy. It allowed us to project what we were doing, in real time, on a TV or computer monitor. Thus, the camera can be mounted in one room and controlled from another, making the CatsEye a popular system among amusement-park operators, or at hospitals, labs, portrait studios—any place where decisions about composition are made remotely or by committee.

Studio Devices

As a point of reference for evaluating portable filmless cameras, we also tested three other studio filmless cameras and CCD-equipped backs that attach to certain cameras. All can produce top-quality images virtually indistinguishable from images shot with film and professional view or roll cameras. Because it requires considerable skill and care to operate these cameras properly, this level of filmless device is almost wholly the province of commercial photographers and prepress professionals.

Two of the devices tested—the Leaf Digital Camera Back and the Dicomed Digital Camera (a portable or studio camera)—are backs designed to fit on various makes of professional view and roll camera bodies, to take advantage of swings, tilts, and top-quality lenses. The third studio-only device, the Leaf Lumina, has its own fixed body and takes interchangeable Nikkor lenses.

These three devices are controlled directly from the computer—the Dicomed and Lumina via a SCSI-2 interface, the Digital Camera via a proprietary ser-

4-by-5-inch prints or for on-screen viewing the Canon camera yields acceptable images.)

Increasingly tightly cropped details are shown in successive images because printing 300-dpi images at the largest sizes possible would eventually exceed the size of this page. The second image from the left shows a detail captured by a $16,020 Fujix DS-515 camera. The full image (equivalent to the image at the far left) at 300 dpi would have measured 2.5 by 1.8 inches.

The next detail (third from the left) was taken with the $27,995 Kodak DCS460 and would have required 6 by 4.2 inches. The $22,500 Dicomed Digital Camera's 31.3MB image (below, at left) would have taken up 11.4 by 8 inches; an image from any of the other cameras would be extremely fuzzy if blown up to that size. The Dicomed captures so much information that its images compare favorably with a scan of 35mm film (far right). Bear in mind, however, that the film image was enlarged by 1525 percent—far higher than normal in professional-quality work. (Images created with the assistance of Crimson Tech, Boston.)



Dicomed Digital Camera, 31.3MB



Film Scan

ial interface. Each must be mounted on a tripod (because they capture their images during a time exposure), and must be plugged into a wall outlet or large battery pack. They save images directly to a hard drive. The software provides sophisticated controls for focusing, composing, color correction, and dynamic range, which can take some time to tweak to perfection. But the bottom line is that perfection is possible, even when compared with top-notch traditional film cameras.

The Last Word

Filmless cameras are not quite mainstream yet, but at the low end they're not far off. For home or small-business users, the Apple QuickTake provides easy input for desktop publishing, visual-information management, and snapshots. In scientific and medical work, the Fujix DS-100 is an excellent choice for nonphotographers, while the Fujix DS-515, Kodak DCS420, and Sony Cats-Eye offer greater precision for imaging professionals.

Professional photographers who need real-time capture would be well served by the Kodak DCS420 or DCS460, or by the Fujix DS-515. While the DS-515's CCD has fewer pixels than the Kodak DCS420's, the DS-515 has better color fidelity and provides superb (if complex) controls. On the other hand, the higher density of the Kodak DCS460 is necessary for images that will be printed large.

The Leaf Lumina, Leaf Digital Camera Back, and Dicomed Digital Camera are venerable professional-quality studio devices when real-time capture is not necessary. The Lumina is a bargain for the quality, while the Dicomed provides superior images with some portability. But the best seller is the Digital Camera Back, due to its speed, reliability, quality, and real-time black-and-white capture.

This latest generation of filmless devices proves we're not dealing with a passing fad. And Minolta, Casio, Olympus, Agfa, Logitech, Chinon, Fuji, and other major photographic or electronic manufacturers are readying filmless cameras for the market.

What will the next generation bring? Higher-resolution images in real time for the professional photographer and price reductions that will capture a larger percentage of the mass market. When that happens, the millennium will come for film, but it isn't here yet. m

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DANIEL GROTTA, an imaging-technology consultant and journalist, and SALLY WIENER GROTTA, a digital artist, photographer, and educator, are coauthors, most recently, of *Digital Imaging for Visual Artists* (Windcrest/McGraw-Hill, 1994).

Technical assistance by Crimson Tech, Boston.

FILMLESS CAMERAS

MW EDITORS' CHOICE

One size does not fit all when it comes to filmless photography. We geared our choices to the cost limits and quality needs of two different kinds of users: home and small-business users and professional photographers.

Home/Small Business

No choice The top contenders in this category are the Apple QuickTake 150 (whose image quality, simplicity, macro lens, and image-touch-up software compare favorably with cameras costing five to eight times as much), and the Kodak DC40 (a slightly more costly camera that offers higher image resolution and storage capacity). Neither unit was shipping during our testing, though prerelease models looked excellent.

Professional Real-Time Photography

Fujix DS-515/Nikon E2 Though complicated to use, this camera's superb image quality and impressive controls set it apart from the competition. **Company:** Fuji, Nikon. **List price:** $12,780; with optional lens and PC card: $14,140.

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Erv Barnes (left), Director of Information Technology, and Ed Herrelko (right), Executive Vice President of Group Sales, at Whirlpool Corporation, Benton Harbor, Michigan

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*Whirlpool uses RemoteWare from Xcellenet, Inc., for access to the IBM mainframe, Passport for Macintosh from Advantis for IBM 3270 terminal emulation and cc:Mail Mobile from Lotus Development Corporation to exchange e-mail between Macintosh and Windows environments.

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WHEN YOU HAVE TO RUN WINDOWS, YOU CAN DO SO FROM THE COMFORT OF YOUR MAC. MACWORLD LAB RATES THE NEWEST OPTIONS.

THE SPLIT-PERSONALITY MAC

Once running Windows programs on the Mac was a grudging experiment. Now it's a mainstay of Apple's strategy; several options compete to offer you the best way to go. For several years, Orange Micro's NuBus-based PC coprocessor cards were the only choice, and few people took advantage of the two-computers-in-one option. Then, 18 months ago, Apple shipped—for a mere 3 months—Quadra 610's with a 25MHz 80486SX-based PC card to test the waters. The response was overwhelming; many people wanted to keep their Macs but also run a variety of Windows programs. Whether they were consultants, home users, educators, or office workers, they wanted Windows on their Macs.

When Apple first got its feet wet in the DOS-compatible market with the



BY GALEN GRUMAN

short-lived Quadra 610, DOS Compatible, the company—and the Macintosh industry—was concerned that such a product would serve as a bridge to Windows, enticing users away from the Mac. Fortunately for Apple and the Mac's future, the reverse has been true. DOS Compatible systems have brought proportionally more former PC users into the Mac market than stand-alone Macs have.

Consider Apple's research comparing buyers of its Power Mac 6100 DOS Compatible with buyers of the regular Power Mac 6100. For every PC convert attracted to the 6100, three are attracted to the 6100 DOS Compatible. Plus, those former PC users spend on average three-quarters of their time using the Mac part of a DOS Compatible system and buy more Mac software than their Mac-only counterparts, Apple found.

Time of Change

In the 11 months since *Macworld* first explored the options to run Windows on a Mac (see "The Mac Does Windows," October 1994), much has changed: Orange Micro has streamlined the number of variants for its cards. Apple came out with a Power Mac 6100 with a PC card in late 1994 and licensed the card's technology to Reply, an IBM motherboard maker that began selling 50MHz and 66MHZ 486DX2-based PC cards for most Quadra models in late 1994. (Reply plans to sell 66MHz 486DX2- and 100MHz DX4-based cards for the Power Mac 7100/66 by this fall.) Apple also has two new systems, the Performa 640CD DOS Compatible and the LC 630 DOS Compatible, that come with PC cards.

The 630-based system also broke new ground for Apple: instead of just adding a card to an existing machine, the company actually redesigned a Mac's motherboard to make room for PC functionality (in this case, the PC's VGA video circuitry). Clearly, PC coprocessing was entering the Mac mainstream.

Now another set of changes is on the horizon. All the PC cards so far have used one of Intel's many 80486 CPU models, or a 486 clone CPU like those from Cyrix and Advanced Micro Devices (AMD). In the past year, the PC market has been shifting quickly from 486's to Pentium CPUs, just as the Mac market has shifted from 680X0's to PowerPCs. Initial Pentiums consumed a great deal of power, but the newest ones match the relatively low power consumption of the PowerPC 601. This points to an inevitable development: Pentium-based PC cards for the Mac.

Both Orange Micro and Reply have high-speed 486-based PC cards that include a Pentium OverDrive socket, which will let you add a Pentium CPU. (Both are expected to ship by October.)

Hardware Options for Windows on a Mac

Company	Phone	Product	Price (Direct/ Company's Estimated Street) [A]	CPU [B]	SoundBlaster Support	Supported Mac Models
Apple Computer	408/996-1010	◀ DOS Compatibility Card	NP/$649	66MHz 486DX2	yes	Power Mac 6100, Performa 6100
		LC 630 DOS Compatible	NP/$1899 [C]	66MHz 486DX2	yes	LC 630 DOS Compatible
		Performa 640CD DOS Compatible [D]	NP/$2299 [C]	66MHz 486DX2	yes	Performa 640CD DOS Compatible
		◀ Power Mac 6100 DOS Compatible	NP/$2499 [C]	66MHz 486DX2	yes	Power Mac 6100 DOS Compatible
Orange Micro	714/779-2772	◀ OrangePC Model 220	$1217 [E]/NP	66MHz 486DX2 (Intel)	no	all Macs with NuBus slot
			$1127 [E]/NP	66MHz 486DX2 (Cyrix)	no	all Macs with NuBus slot
		◀ OrangePC Model 290	$1857 [E]/NP	66MHz 486DX2 (Intel)	no	all Macs with NuBus slot
			$1767 [E]/NP	66MHz 486DX2 (Cyrix)	no	all Macs with NuBus slot
			$1837 [E]/NP	80MHz 486DX2 (AMD)	no	all Macs with NuBus slot
			$2037 [F]/NP	100MHz DX4	no	all Macs with NuBus slot
Reply	408/942-4804, 800/801-6898	DOS on Mac	$495 [F]/NP	50MHz 486DX2	optional ($95)	all Centrises and Quadras except the 630 and AVs
			$595 [F]/NP	66MHz 486DX2	optional ($95)	all Centrises and Quadras except the 630 and AVs

◀ = *PC and controller software runs as native Power Mac program.* *NA = Not applicable. NP = Not provided* [A] *Actual prices may be higher or lower than the estimated street price provided suppliers; supplier is listed only when price varies.* [C] *Complete Mac system with PC card.* [D] *Expected to ship as this issue appears.* [E] *Price does not include Windows ($89).* [F] *Price does not Windows). Networking software (Ethernet or Token Ring) costs an additional $50.* [G] *Parallel and serial port come with $150 SoundBlaster upgrade.*

PC magazines have expressed disappointment in these $500 OverDrive upgrades, since the Pentium's performance is hobbled by the 486's slower bus.

Better to wait for Orange Micro's following set of PC cards, which will use a Pentium from the get-go and be designed to take full advantage of it. They're due this fall. Reply's Pentium plans are not final, although a product manager made it clear that Pentium is also in Reply PC cards' future. Apple won't say yet whether it has plans for the Pentium, but Apple's product managers say the company is committed to providing more PC options and expects to offer more cards in the coming months.

Orange Micro's Pentium-based cards go one step further: they will be the first PCI-based PC cards, taking advantage both of a PCI bus on the card itself for fast PC processing and of the new Macs' PCI bus for faster communication with Mac peripherals.

Apple has also committed to a PCI-based PC card and expects to have one available around November. Reply won't have a PCI card until 1996, at the earliest, since its license to Apple's PC technology currently does not cover non-PDS (Processor Direct slot) systems. (Reply licenses several Apple components.)

Reply and Orange Micro have also started improving the video circuitry of their cards. Both companies are using faster VGA control chips for their video circuitry and are adding VRAM to their new models. The result will be a steadier display and support for more colors at larger screen sizes—up to 256 colors on a 19-inch monitor, 32,768 colors on a 17-inch monitor, or 16.7 million on a 14-inch monitor. The first PC cards used slower (cheaper) VGA controllers, and they supported just the minimum-standard VGA and SuperVGA resolutions (256 colors at 640-by-480-pixel resolution and 16 colors at 800-by-600-pixel resolution, respectively), which can sometimes flicker. Orange Micro's new video circuitry also bypasses some of the NuBus performance bottleneck, which should make scrolling and screen redraw faster; the company expects to bring that video technology to at least some of its NuBus products later this year.

Which Option for Your Mac?

With these changes, what do you do if you need your Mac to run Windows now? The answer depends on the kind of Mac you have, since each option works with only a subset of the Mac lineup. For most Mac models, you have limited choices.

- If you have a NuBus-based Mac or Mac clone, the Orange Micro cards are often the best bet, since many Macs have NuBus and the cards are available in three speeds: 66MHz 486DX2, 80MHz 486DX2, and 100MHz DX4.
- For many NuBus-based 040 Macs (the Centris 610 and 650, and the Quadra 610, 650, 700, 800, 900, and 950) and the Power Mac 7100/66, a better bet may be Reply's DOS on Mac and DOS on Power Mac cards, which plug into the Mac's PDS. PDS cards are faster than NuBus cards (because PDS is faster than NuBus), but you can't move them to as many Macs. For Centrises and Quadras, the DOS on Mac cards come in just two speeds: 50MHz 486DX2 and 66MHz 486DX2. For the 7100/66, the planned DOS on Power Mac card also offers two speeds: 66MHz 486DX2 and 100MHz DX4. Power Computing (512/258-1350) expects to offer these Power Mac–specific Reply cards in some of its clones later this year, after Reply redesigns the cards to work in faster Power Macs like Power Computing's Power series.
- If you have a Mac that uses the LC III–style PDS (this includes the Performa 470 series, 550 series, 570 series, and 630, plus LC and Quadra equivalents), you'll have to use a software solution, as there is no hardware option for that slot. Apple does sell the LC 630 DOS Compatible and the Performa 640CD DOS Compatible, full Mac systems that include a PC card in the PDS.
- For a Power Mac 6100 or Performa 6100, you can add an Apple DOS Compatibility Card in the PDS. Apple also sells 6100's with the card installed.
- If you have or plan to buy a new PCI-based Power Mac from Apple or another Mac maker, your only option will be the Orange Micro series 400 cards, which should ship by October. Expect more PCI options from Apple and Orange Micro later this year.
- Any 040 or Power Mac can run Insignia Solutions' SoftWindows software, but it's slow—about one-fourth as fast as a card on a Power Mac, one-fifth as fast on a 68040 Mac—and you'll need

On-Card RAM	On-Card SIMM Slots	PC Ports
none	1	serial, parallel, joystick, video
4MB	1	serial, parallel, joystick
none	1	serial, parallel, joystick
none	1	serial, parallel, joystick, video
8MB	none	serial, parallel
8MB	none	serial, parallel
8MB	none	serial, parallel, PCMCIA
8MB	none	serial, parallel, PCMCIA
8MB	none	serial, parallel, PCMCIA
8MB	none	serial, parallel, PCMCIA
none	1	joystick, video[G]
none	1	joystick, video[G]

by the company. [B] Companies often use different CPU include DOS or Windows ($50 for DOS, $95 for DOS and

at least 16MB of RAM, or better yet, 24MB. Another significant limit is version 1.0's lack of support for Windows' Enhanced Mode, which many programs now require. Version 2.0 will support Enhanced Mode and is expected to ship in mid-August 1995. But expect no speedup with this Power Mac–only version.

- And you can run Timbuktu on any Mac, although you need to be networked and have a real PC that you control via Timbuktu. For occasional use, running Windows remotely is a great option, since the performance is more than adequate.

Hardware versus Software

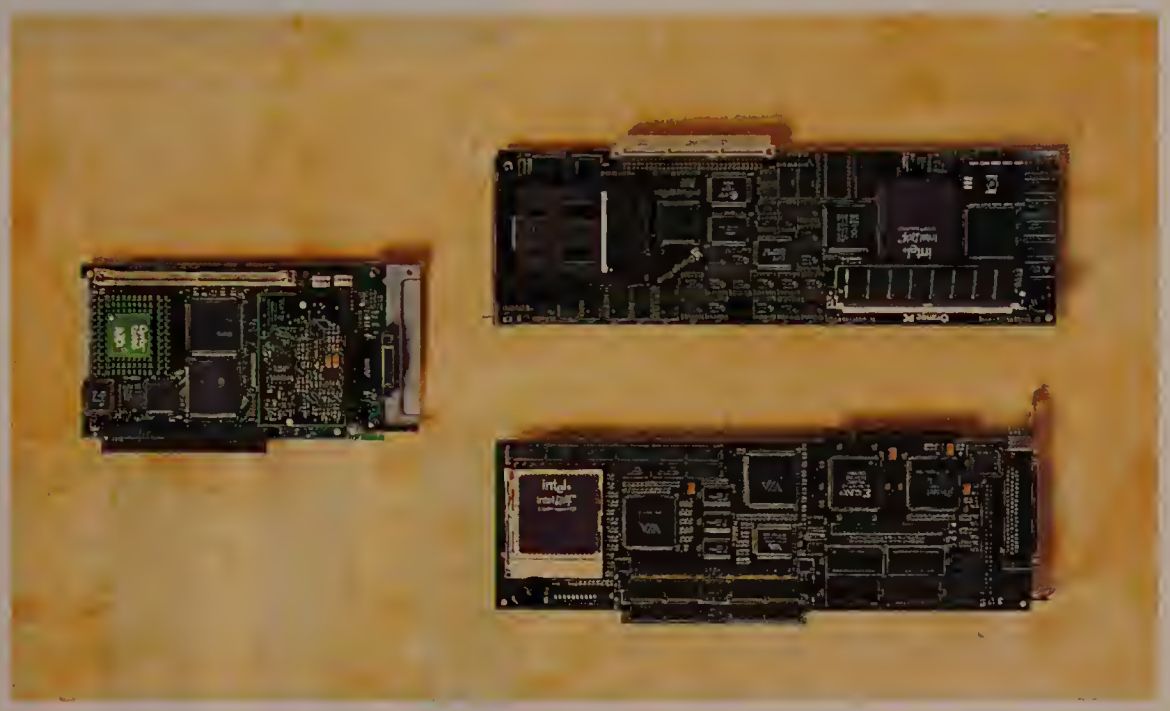
For most Macs, you have a choice of at least one hardware option and one software option. I recommend hardware in almost every case, since that provides you the best performance. Even on a Power Mac 7100/80, SoftWindows runs at less than 25MHz 386SX speeds, which is a little slower than a Centris 610. The Macworld Lab benchmarks in "Are Windows Macs Good Enough?" show the performance of each Windows option for your Mac—it's readily apparent that the hardware options are the speediest.

Which Card? Hardware coprocessing is a better bet because you get a real PC motherboard operating at PC-level speeds. You don't have the slowdown of emulation or very much contention for Mac resources (so you can have your PC card do work while you're doing something else on the Mac).

The drawback to a hardware solution is that you can't always move hardware from one Mac to another. For example, neither a NuBus-based Orange Micro card nor a PDS-based Reply card works on a PCI Mac. And Reply's DOS on Power Mac card will initially work only in the 7100/66, because the PDS in the other 7100 and 8100 models is too fast for the card's bus controller and the card won't physically fit in the 6100. (Reply hopes to have the cards working on the other NuBus Power Macs this fall.)

If you have a choice between a Reply card and an Orange Micro card—which you do for most Quadras and the Power Mac 7100/66—the decision is a tough one. Megahertz for megahertz, Reply's cards are faster than Orange Micro's because NuBus slows down the Orange Micro cards. If your performance needs are moderate—486DX2-level systems—the Reply cards are cheaper and a bit faster than the Orange Micro products with the same CPUs. But Orange Micro's cards work on the Power Mac 6100, 7100, and 8100 series, while Reply is limited to the 7100/66.

Whichever card you get, be aware that all models include add-on ports (or offer them as an option), so you can have a direct connection to a printer or modem, rather than use the Mac's. (You can, of course, use the Mac's serial ports for printers and modems.) Keep in mind that you can add one SIMM to an Apple or Reply card, which reserves that RAM for the card. If you add no memory to the PC card, it will share your Mac's RAM. The Orange Micro cards come with on-card memory, and you can buy them with 4MB to 32MB of RAM.



PAUL FRANZ-MOORE

Windows on Mac Options Among the third-party hardware options for running Windows on the Mac are Reply's 66MHz 486DX2-based product (left), and Orange Micro's current 100MHz DX4-based NuBus card (top right) and planned PCI card.

SoftWindows or Timbuktu? In a few situations, though, software is a better bet. Software is easier to move from one Mac to another, although SoftWindows 1.0's performance is so sluggish that you'll only want to use it on a faster Power Mac. That's because it emulates a PC's CPU—a complex process. We also tested a beta version of SoftWindows 2.0; it was slower still, but should attain version 1.0 speeds by the time it ships. And the new 2.0 version won't run on a 680X0 Mac, so portability is not a strong argument for SoftWindows.

Timbuktu is another matter, since this remote-control software runs on any Mac. Where Timbuktu gets tricky is on the PC side. First, the type of network you have dictates what version of Timbuktu you can use on the PC that's being controlled remotely. Timbuktu for Windows will work over an AppleTalk network (if your PC has an Ethernet or LocalTalk card installed), while Timbuktu Pro for Windows requires a TCP/IP or Novell IPX network. Timbuktu Pro for Mac handles all three network protocols. But the AppleTalk-based Timbuktu for Windows will not work with Windows 95, unless you install AppleTalk for Windows (which comes with Apple's latest Workgroup Servers and with Miramar Systems' Personal MacLAN Connect 5.0 software).

I've always liked Timbuktu as a way to run Windows software on an occasional basis, since it's easy and fairly speedy. Plus it's a great way to share data between Macs and PCs. But it makes the most sense for a network where more than one person will need to run Windows. The only negative is that you can't run DOS software in full-screen mode; you must run it in a Windows window.

Software Options for Windows on a Mac

Company	Phone	Product	Price (List/ Company's Estimated Street) *	SoundBlaster Support	Supported Mac Models
Farallon Computing	510/814-5000	Timbuktu Pro 1.04 for Macintosh	$199/$150	no	all
		Timbuktu 1.1 for Windows	$199/$150	no	those on an AppleTalk network
		Timbuktu Pro 1.0 for Windows	$199/$150	no	those on a TCP/IP or Novell IPX network
Insignia Solutions	415/694-7600	SoftWindows 1.0 for Macintosh	$499/$300	no	all 040-based Macs
		SoftWindows 1.0 for Performa	$399/$200	no	all Performas except the 200
		SoftWindows 2.0 for Power Macintosh **	$399/$200	no	all Power Macs
		SoftWindows 1.0 for Power Macintosh	$499/$300	no	all Power Macs

** Actual prices may be higher or lower than the estimated street price provided by the company. ** Expected to ship as this issue appears.*

Price Differences The costs of hardware may seem to be dramatically higher than those of software, but once you upgrade your system to run the software, the cost differences are much less. For example, if you seek 66MHz 486DX2 performance for a Power Mac 7100, you have four options: an Orange Micro card, a forthcoming Reply card, SoftWindows, and Timbuktu. If you start with a 7100 that has a 500MB hard disk and 8MB of memory, you'll have to spend the following (based on current street prices as we went to press) for each option to get equivalent performance:

- OrangePC Model 220 card, $1127 (with 8MB of RAM); Windows, $89; and 365MB external hard drive, $375. Total: $1591.
- SoftWindows 1.0 or 2.0, $300; 16MB of RAM, $700; and 365MB external hard drive, $375. Total: $1375. (And performance will be fourth that of a card.) You should add a cache card ($200) if your Power Mac doesn't already have one, and you should consider getting a CPU booster ($175) to make the system, and thus the emulation, run faster.
- Timbuktu software (one Mac and one Windows copy), $300; 66MHz

MW LAB

Are Windows Macs Good Enough?

WINDOWS-APPLICATION INDEX

Times as fast as a 33MHz 486DX PC (486DX = 1.0).

Use these results to compare the performance of systems for popular Windows programs not available on the Mac that a Mac owner may want to use.

CORE-PERFORMANCE INDEX

Times as fast as a Classic (Classic = 1.0).

Use these numbers to compare any Mac or Windows PC.

Best result for a Mac product in each test suite. Products are listed in order of overall Windows performance, followed by a group of PCs (shown in italic) to be used as points of comparison. Higher scores are better.

	Overall	Adobe Info Publisher 2.0	Lotus Ami Pro 3.01	Lotus 1-2-3 4.01	Microsoft Access 1.1	Common	Scientific
	Average of the four Windows application test suites.	Database queries and data sorts.	Find and replace, layout reformat, and file-format conversion.	Integer and floating-point calculations, file opens, and scrolls.	Report generation, file-format translation, and data sort.	A series of business tasks in Microsoft Word and Excel that test processor, video-display, and disk-access operations.	
Reply DOS on Mac* 100MHz DX4 on 7100/66	1.5	1.4	1.9	1.4	1.4	30.7	85.4
OrangePC Model 290 100MHz DX4 on Centris 650	1.4	1.5	1.8	0.9	1.5	27.4	79.0
Reply DOS on Mac 66MHz 486DX2 on Centris 650	1.0	1.0	1.3	0.9	1.0	17.8	52.3
Apple Performa 640CD DOS Compatible	1.0	1.0	1.3	0.8	1.0	18.6	53.5
Apple Power Mac 6100 DOS Compatible	1.0	1.0	1.0	0.8	1.1	19.3	54.7
OrangePC Model 290 66MHz 486DX2 on Centris 650	0.9	1.0	0.6	0.8	1.0	19.6	55.7
OrangePC Model 290 66MHz 486DX2 on 7100/66	0.8	0.8	0.9	0.7	0.7	19.3	44.2
Reply DOS on Mac 50MHz on Centris 650	0.8	0.7	0.9	0.7	0.8	14.4	41.1
Timbuktu Pro 1.0 on 33MHz 486DX PC (Ethernet)	0.6	0.7	0.5	0.3	0.7	11.0	31.1
SoftWindows 1.0 on 8100/80	0.4	0.4	0.6	0.4	0.4	8.6	14.4
SoftWindows 2.0* on 8100/80	0.3	0.3	0.4	0.3	0.3	5.9	10.1
SoftWindows 2.0* on 7100/66	0.2	0.3	0.3	0.2	0.2	4.6	7.2
120MHz Pentium (Gateway 2000 P5-120)	3.3	4.4	2.8	2.2	3.8	59.8	190.9
100MHz Pentium (Micron)	3.3	3.8	3.4	2.1	3.9	52.3	164.3
90MHz Pentium (Micron)	2.6	2.6	3.0	1.9	3.0	44.1	140.8

**Prototype version; results may improve on final version.*

BEHIND OUR TESTS

Macworld Lab compared Windows performance in two ways: (1) For the Windows-Application Index we performed tests using popular Windows programs that have no Macintosh equivalent; this lets you directly compare the Windows performance of the products we tested. (2) For the standard Core-Performance Index, we performed identical tests in two programs available for both Windows and the Mac (Microsoft Word and Microsoft Excel). This method lets you compare the performance of any Mac and any Windows PC.

Both sets of tests exercise components of PC performance: integer (standard) computation, disk access and system overhead, video display, and floating-point computation. The results give a balanced view of overall performance. All systems were tested with 24MB of total RAM (for the PC cards, 16MB of this was on the card) and in 256-color, 640-by-480-pixel resolution.**—Macworld Lab testing supervised by Danny Lee and Galen Gruman**

486DX2-based PC with 8MB of RAM, quad-speed CD-ROM drive, and 800MB hard drive, $1700. Total: $2000. (If the PC or Mac doesn't have built-in networking hardware for your network type, add $150 per system.) The more people using Timbuktu to run the PC, the cheaper per person this option becomes.

The Fun Stuff Multimedia is the thing among PC users, and for them, multimedia means a CD-ROM drive, stereo speakers, and noisy, action-packed games like Doom. Any PC that wants to be considered multimedia has a SoundBlaster-compatible card to generate the stereo sound. PC options for Macs are no different.

Reply's and Apple's cards accept 16-bit SoundBlaster-compatible daughterboards, so you can run SoundBlaster-specific PC software like Doom. (Orange Micro has no SoundBlaster option.) You can connect the SoundBlaster card to the Mac's internal audio circuitry, so you can use the Mac's built-in speakers and CD-ROM drive with the cards. The cards also let you connect a PC joystick to get the full PC multimedia experience.

You don't get SoundBlaster support with Timbuktu for Windows, since there's no way to move the audio data from the PC's sound card (if it has one) over the network to the Mac's audio circuitry. Plus, Timbuktu is really designed for letting technical-support staff control users' computers remotely for troubleshooting or management. The Windows-on-Mac option is just a side benefit. SoftWindows 2.0 does not support SoundBlaster either, although it does support standard Windows audio, so you can play sound (WAV) files and listen to audio in Video for Windows (a QuickTime equivalent) clips.

Working with Peripherals Fortunately, all Windows options work well with most Mac and PC peripherals. The list of items that work with all the Windows-on-a-Mac solutions is fairly complete: standard Mac and VGA monitors; PC floppies, CD-ROMs, and removable media; Mac and non-Mac printers (you'll need a Mac driver for non-Mac printers, but Apple's and Reply's cards come with software that supports PCL and Epson-compatible PC printers, which are mainstays in the PC universe); and Mac modems and mice (although you have to press a key like ⌘ or control while clicking to simulate a PC's right-hand mouse-button click). All options let you exchange files between the Mac and PC by establishing shared folders on hard drives that both systems can access.

The only time you may encounter problems is when working with external SCSI hard drives from a PC. In the PC world, each SCSI card formats hard drives differently, so only rarely can you share a hard disk among PCs using different SCSI cards. In the Mac, the SCSI circuitry for all models handles drives the same way, so this is never an issue. But you may find that an external PC SCSI hard drive won't work reliably when connected to your Mac and accessed by the PC card—it's that format problem. Symptoms include incomplete file transfers and inconsistent directory contents. If your PC uses an Adaptec SCSI controller, you have the least chance of such problems.

The Last Word

If your work, family, or play forces you to choose between a Mac and a PC, take the third route and add a PC to your Mac. If you own any 040 or Power Mac except the 500, 630, 5200, or 6200 series, there are solid hardware choices available from Apple, Orange Micro, and Reply. If you do have a 500, 630, 5200, or 6200 series Mac, consider trading up to a model that supports a hardware option, since emulation limits Insignia Solutions' SoftWindows to a disappointing performance level. If you're in a networked environment where several people need Windows access, consider Farallon's Timbuktu.

The good news is that Windows support on the Mac is no longer an experiment. With Apple's recent blessing of products that run Windows from your Mac (occasionally, of course), you should have no trouble keeping your Mac and running Windows now and in the future.

Apple has clearly recognized that DOS and Windows are part of the Mac's future and has taken appropriate steps to create a scenario in which the Mac still thrives. Today, you can buy dual Mac/PC systems from Apple, add a PC via card to most current Mac models, control a remote PC from a Mac over the network via Timbuktu, or occasionally run Windows software in emulation via SoftWindows. Later on, you may find Macs that have the long-rumored PowerPC 615 CPU, which is supposed to run both Mac and PC software, removing the need for Apple or third parties to add an Intel CPU to a Mac.

Whether or not there is a 615, in a few years it won't really matter. In 1997, Apple, IBM, and others will sell systems based on the converged hardware reference platform, a PC specification that will run Mac, Windows NT, OS/2, and Unix software (see "Mac Hybrids," *Macworld*, April 1995). That would leave out only Windows 95 software, which a PC card or 615 chip would take care of until Microsoft merges Windows 95 and NT in its Cairo OS due the following year.

In the meantime, look for more changes as the transfer from NuBus to PCI and from 486 to Pentium gives companies the opportunity—and incentive—to make these Windows options even better. Chances are, your questions are no longer whether and how but when. Base that decision on your system-upgrade plans: hold off on getting a PC card if you plan to get a new Mac in the next year; otherwise, pick from today's options. m

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Macworld executive editor GALEN GRUMAN regularly uses both Macs and PCs, and at times loves and hates them both.

DOS/WINDOWS CARDS

MW EDITORS' CHOICE

Because most products for running Windows on a Mac are tailored to specific Mac models or work environments, users often have limited options for their specific needs. However, where there is a choice, the main considerations are performance, full Windows compatibility, and price.

For Most 040 Macs

DOS on Mac Because it plugs into a Quadra-style PDS, this card is a bit faster than Orange Micro's more expensive offerings. The DOS on Mac card (available in two speeds) also lets you add a SoundBlaster-compatible audio card, a must for PC games and multimedia. **Company:** Reply. **Direct price:** $590 for 50MHz model, $690 for 66MHz model (prices include MS-DOS and Windows).

For Most Power Macs

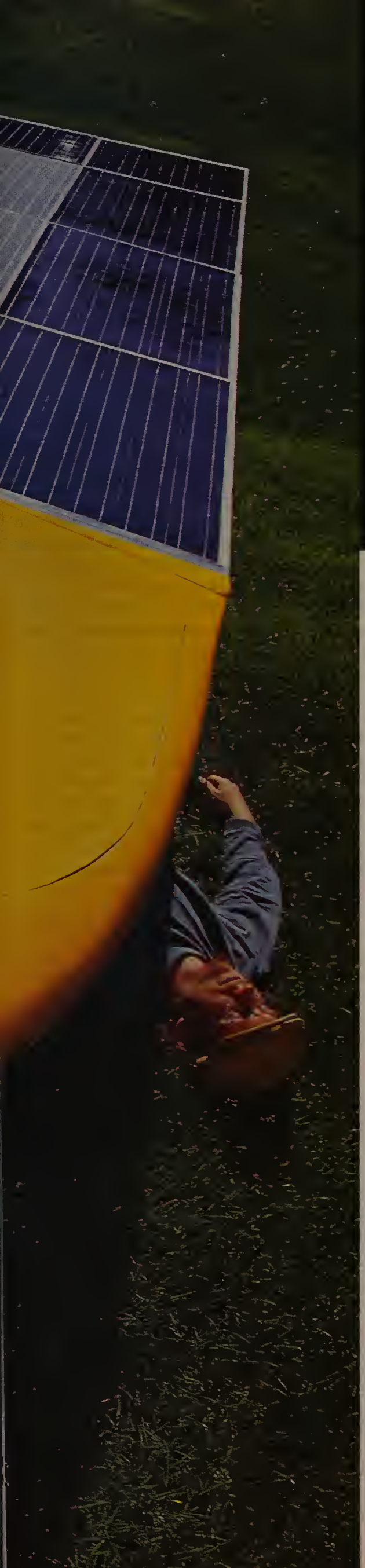
OrangePC Model 220 Although NuBus slows its CPU down a bit, the Model 220 works in any Power Mac except a PCI-based model. The 220's performance far outweighs that of a software-based emulator for not much more cost. You also have a choice of true-blue Intel CPUs or lower-cost 486 clones. **Company:** Orange Micro. **Direct price:** $1217 (includes 8MB of RAM, a 66MHz 486DX2 CPU from Intel, and Windows).

For Occasional Windows Access

Timbuktu For Mac owners on a network, this remote-control software lets you control a PC from any Mac, with speedy performance and a low cost. **Company:** Farallon Computing. **List price:** $199 per user.



Mathematical Cruise-Control Researchers at Drexel University use the mathematics program Maple IV on a Power Mac to model speed and power to help squeeze the best performance out of their experimental solar-powered car.



BRIAN SMALE

THE POWER MAC'S SCIENTIFIC REVELATION

MW LAB

ENGINEERS AND SCIENTISTS FINALLY HAVE THE HORSEPOWER THEY'VE ALWAYS NEEDED WITH THE INTERFACE THEY'VE ALWAYS PREFERRED

In the Macintosh world, people sometimes forget that computers were originally designed for science rather than desktop publishing. Since the 1940s—when the need to model nuclear explosions was the driving force behind the development of the first vacuum-tube computers—typical science applications have not only been computation-intensive, they have also operated on huge data files. Science has always demanded the ultimate in computing power.

Although power was exactly what the Mac *didn't* have until fairly recently, Macs nonetheless attracted many loyalists in math, statistics, chemistry, molecular biology, and related research areas. More than half of the 200 largest Mac sites are science or research organizations, which have historically adopted the Mac for the same reasons as design professionals—ease of use, flexibility, and great graphics. Scientists and engineers in a wide range of fields rely on computer modeling whose demands can put an imaging service bureau to shame.

BY CHARLES SEITER

Scientists loved the Mac so much that they often used it as a display device for huge data sets running on minicomputers or on Unix-based RISC (reduced instruction set computer) workstations. But the Mac's relatively puny processing power couldn't begin to address these users' primary computing needs.



ROBERT HOLMGREN

StatView Analysis Dr. Michael Dunn, director of the spinal cord injury center at the Veteran's Administration hospital in Palo Alto, California, depends on StatView to handle factor analysis of huge data sets concerning patient-staff relations.

Has Apple at last rewarded the loyalty of the scientific community with low-cost Macintosh systems that offer workstation performance on scientific applications? Does a Power Mac 7100/66 that costs about $2500 have what it takes to be a computation workhorse? To answer these questions, we tested an array of scientific applications to compare Power Macintosh versus 680X0 performance (for a look at chemistry and biology software, see the sidebar "Power Mac and the Wet Sciences"). We wanted to determine whether the Power Mac enables applications and techniques that were impossible or impractical on a 680X0 Mac.

How RISC Helps

Many factors affect application performance, but for the science applications in this article, three are critical: integer calculation, floating-point calculation, and input/output (I/O). RISC processors like the PowerPC family outpace their CISC (complex instruction set computer) predecessors, such as Motorola's 680X0 series that powered the original Macs, by replacing a long list of commands with a small, highly optimized set. That vastly speeds up integer calculations—a top priority for PowerPC chip designers.

Those designers also paid careful attention to the floating-point operations built into the chip (the source of the annoying "no coprocessor installed" message you see when using some not-ready-for-RISC software). On-chip floating-point capability yields major speed increases in the matrix and Fourier operations typical in scientific applications.

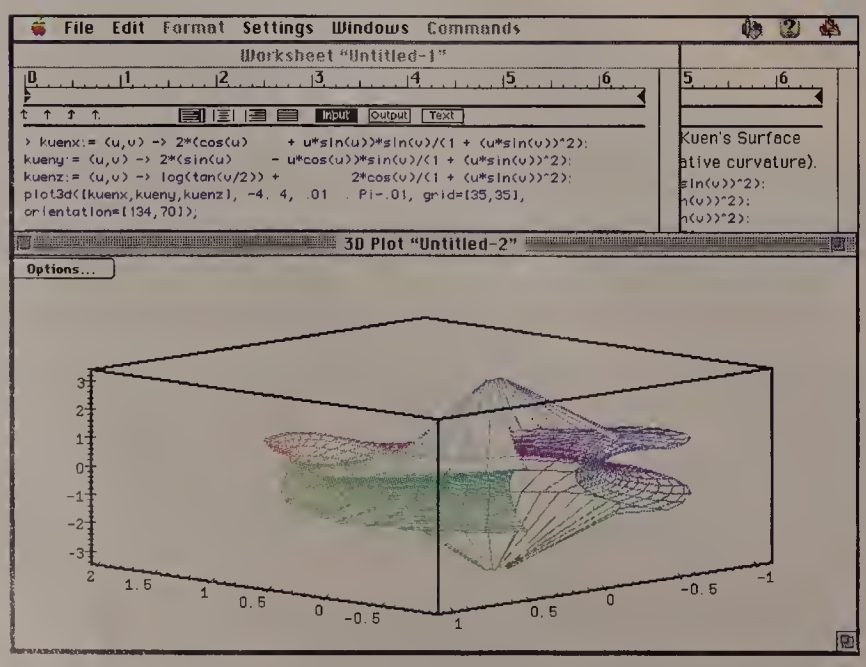
Only in I/O does the PowerPC family fail to offer much help. This is not because of the CPU, however. In order to get its Power Macs out the door rapidly, Apple chose not to translate a large number of the Mac Operating System's toolbox routines; this means the PowerPC processor must emulate those operations' 680X0 code. In particular, I/O functions were not ported to native PowerPC code, which means that I/O performance on Power Macs is roughly equal to that on older Macs. I/O performance should improve significantly, however, as faster PCI-based data-transfer cards come to market to serve the new generation of PCI-based Macs.

Another consideration in RISC application speed is sheer programmer talent and diligence. In converting an application written in C or Pascal for a 680X0 processor into a PowerPC application, the programmer makes several decisions, all of which affect performance. All applications are mixed code to some degree. The programmer must decide how much of the original program to convert to native PowerPC code and which parts can run in emulated 680X0 mode. He or she also has to decide whether to rewrite parts of the original code from scratch, to take advantage of special data-alignment tricks and other RISC-specific efficiencies.

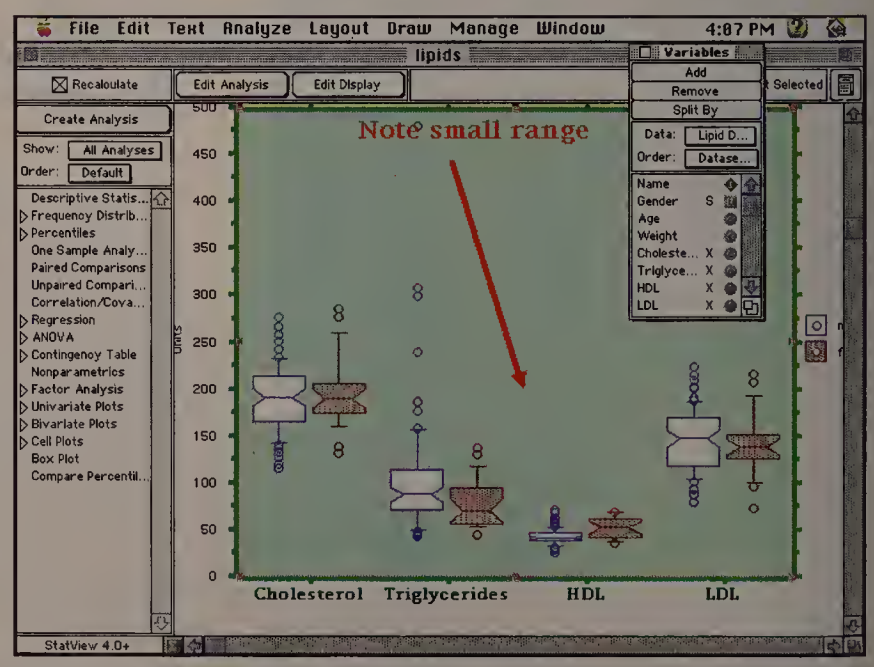
Worth the Wait

These delicate programming issues have had another kind of speed effect: slow shipment of applications. In some cases, the developers have been tinkering for months seeking better performance. Other developers encountered new problems when System 7.5 was released. Some developers were waiting for Symantec's native Power Mac version of the C++ compiler rather than using Metrowerks' CodeWarrior; the Symantec compiler finally shipped in spring 1995, more than a year late. Consequently, many familiar and important Mac science applications were still not quite shipping in June 1995.

The earliest shipping major applications—the symbolic-math program



Maple Graphics Though more of a pure-math system than its competitors, Maple includes wire-frame 3-D graphics for engineers.



StatView Annotations StatView's journal-oriented graphics can be enhanced with color and annotation for slide presentations.

In the fields of chemistry and biology, a Power Mac with native software is rapidly replacing expensive special-purpose hardware that only a few scientists can access. Gene Codes' Sequencher 3.0 ($2600 commercial, $1800 nonprofit; 313/769-7249) is an effective substitute for dedicated multiprocessor genetic-sequence-matching systems. Research Systems' imaging program, IDL, allows a Power Mac to replace high-performance medical-imaging workstations. CAChe WorkSystem, from CAChe Scientific, gives molecular-modeling results on a Power Mac that used to demand a scientific supermini.

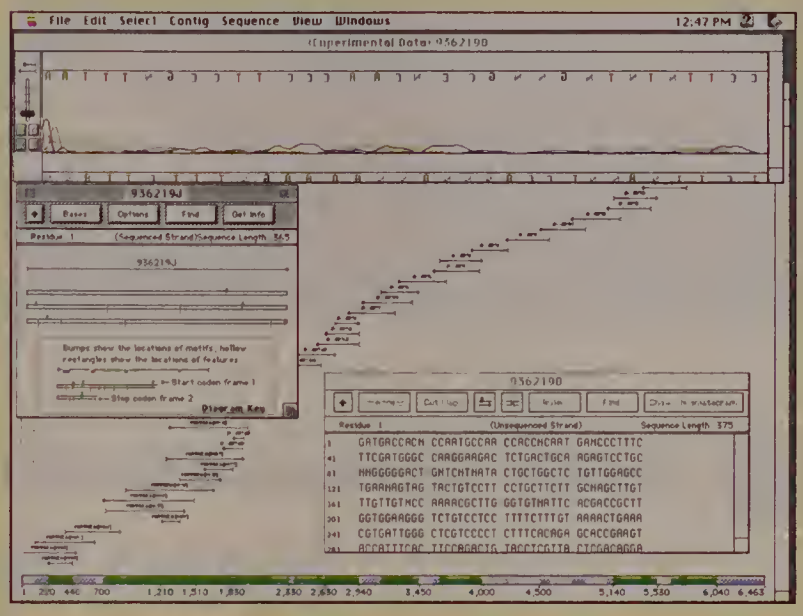
In several key examples that do not involve I/O, the best 680X0 system was a little too slow for any serious scientist in these realms to rely on. The twofold to fivefold speed boost now available from a Power Mac makes this machine a workable alternative to systems costing $100,000 and up.

Sequencher was among the first molecular biology programs to appear for the Power Mac. Although managing DNA and protein sequences has more in common with the search-and-replace functions in word processors than with floating-point numerics, the Power Mac version of Sequencher squeezes out speed improvement of more than a factor of four. It happens that the PowerPC series of processors is well designed for comparing character strings as well as crunching numbers, and Gene Codes has found a way to exploit this capability.

Following the impeccable logic that no standard Mac had the floating-point computational horsepower to be anything more than a display station for calculations performed on bigger computers, CAChe Scientific designed previous versions of CAChe to run on a RISC-chip coprocessor board in 680X0 Macs. Thus, when the Power Macs appeared, the company had a considerable head start on porting this huge program (it requires a minimum of 24MB of RAM). But CAChe on a Power Mac is a self-contained, complete research system for molecular modeling; its computational speeds approach those of minicomputer chemistry software. CAChe is costly, but the educational-discount version, at $3995, makes it possible to do real molecular modeling in student labs—a pipe dream at any price a few years ago.

IDL, a particular favorite for medical-imaging applications, appeared in a Power Mac version in early 1995. Because the core of IDL is a flexible, interpreted programming language with a powerful set of image-manipulation commands, the Power Mac version of IDL can't take advantage of the full scope of floating-point speedups that's available to compiled applications. Everything runs approximately twice as fast rather than four or five times as fast, partly because of interpreted-language challenges but also because most IDL tasks involve transferring huge image files, and such operations suffer from Apple's failure to write the Mac OS I/O system calls into native PowerPC code. Fortunately, I/O performance should improve significantly on the new PCI-based Power Macs. (For a look at another scientific image processor, see the review in *Macworld,* August 1995, of MacPhase 2.0.)

When we planned this article, we expected to report results for several other programs. Unfortunately, Power Mac versions of many important imaging, molecular biology, and chemistry applications are still in development. Developers are steadily—though slowly—debugging and optimizing, since unlike consumer- and business-market software buyers, scientists are, appropriately, quite unforgiving about half-baked software. Every important Mac science and engineering application should eventually come out in a Power Mac version—it's just taking a bit longer than anyone expected.



Sequencher Alterations This molecular biology tool combines a fast genetic sequence and alignment algorithm with convenient display of results. All sequences and alignment criteria in this window are editable.

Mathematica ($995, Wolfram Research, 217/398-0700) and the molecular-design program CAChe WorkSystem ($3995 to $29,995, depending on configuration; most users pay $3995 to $4995) from CAChe Scientific (a division of Oxford Molecular Group, 503/526-5000)—were both already running on IBM's Power 8100 RISC chips in other AIX-based systems when the Power Mac appeared. There's apparently no easy substitute for a year's experience with RISC compilers.

Queen of the Sciences

Consider, as an illustration of the difference between 680X0 and PowerPC computing, the case of Mathematica. Mathematica is actually two programs, a computation *kernel,* and a *front end* that handles the user interface. As far back as the Mac II, both kernel and front end were available for Macintosh, but the Macintosh user's guide gently suggested running the front end only and using it to communicate with a kernel running on a "real" computer somewhere. By late 1994 demonstrations at the Mathematica Developers' Conference were almost exclusively presented on 8100/100 Power Macs—the Mac had become the platform of choice for both the front end and the kernel.

Math software vendors, already quite aware of the value of RISC, were among the first to release PowerPC versions of their products. We tested Mathematica 2.2, Maple V 3.0 ($795, Waterloo Maple Software, 519/747-2373), HiQ ($695, National Instruments, 512/794-0100), and MATLAB 4.2 ($1695, The MathWorks, 508/653-1415). (There isn't a PowerPC version of MathCAD yet, and since the other popular math program, Theorist, was acquired by Waterloo Maple Software, most of its symbolic-math routines are borrowed from Maple.)

Our lab tests show that the PowerPC versions of these applications offer a wide

range of speed enhancements over the 680X0 versions. (These programs do not perform even the most basic functions in exactly the same way, so our speed timings are not meant for comparison across programs. The same caveat applies to our evaluation of statistics software.) Since floating-point operations on data elements that are all the same length are especially suited to RISC processors, National Instruments' HiQ was able to show how vast the RISC difference can be in the test of taking powers of a large real-number matrix. The Power Mac version of HiQ on a 7100/66 performed this test more than 13 times as fast as the 680X0 version on a Centris 650.

Graphics tests of all the math applications showed more modest, though still significant, native-mode enhancement—from 1.8 to 4.5 times as fast as the 680X0 versions. A typical graphics test involves some floating-point computation but also depends heavily on QuickDraw toolbox calls that run largely in emulated code. The final speed result, for graphics, is thus a mixture of fast computation and barely-speeded-up toolbox calls. Math-application vendors say that faster graphing is a priority but will require extensive fine-tuning of code in the next versions.

A speed increase of two to four times was also seen in tasks that are mostly symbol manipulation, which provides an effective measure of integer arithmetic performance. This category of tests includes the loop assignment test in MATLAB and HiQ, the symbolic computation test in Mathematica, and the integer test (which includes both integer and symbolic computation) in Maple. On these tasks, the processor swaps data in and out of registers and performs comparisons, so the programming details of data handling largely determine performance. While Maple showed relatively small speed enhancements, HiQ, MATLAB, and Mathematica showed a consistent twofold or greater improvement.

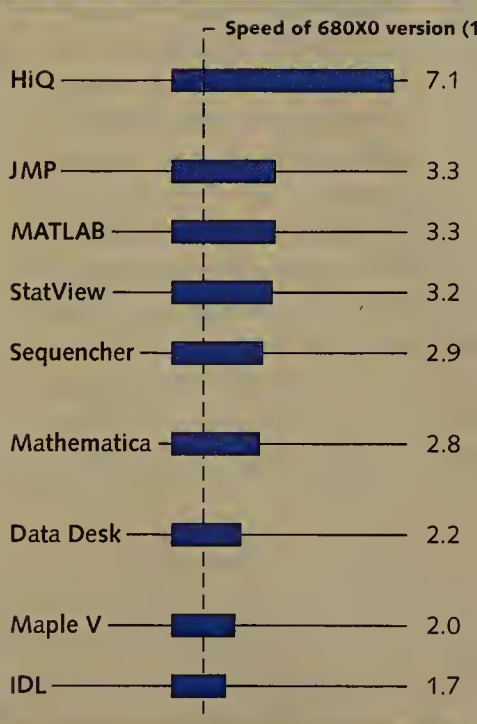
Because they are available on many other platforms, including Pentium-based Windows PCs and non-PowerPC RISC-based scientific workstations, mathematics programs are a good reference for deciding how Apple's new hardware fits into the larger world of scientific computing. In a spot test of Mathematica on a Windows computer using a 90MHz Pentium processor, and configured comparably to our Power Mac 7100/66 machine, the performance was about equivalent to that of the Centris 650.

The Power Mac's 10- to 13-fold performance improvement over 680X0 machines on some kinds of pure floating-point problems obviously turns heads, but is a 3-fold improvement in symbol-manipulation speed going to change the world? It might not change the scientific

MW LAB Scientific and Technical Software—How Much Faster on a Power Mac?

These results show the relative speed of a 66MHz Power Mac 7100/66 running native Power Mac software and a 25MHz Centris 650 running 680X0 versions of the same programs. Software is ranked in order of average degree of improvement over 680X0 versions. The figures should not be used to rank applications by speed. (For example, while the Power Mac version of JMP is 3.3 times as fast as the 680X0 version, JMP may not be faster than StatView, another statistics program.)

Longer bars are better.



TIMES AS FAST AT SPECIFIC TASKS

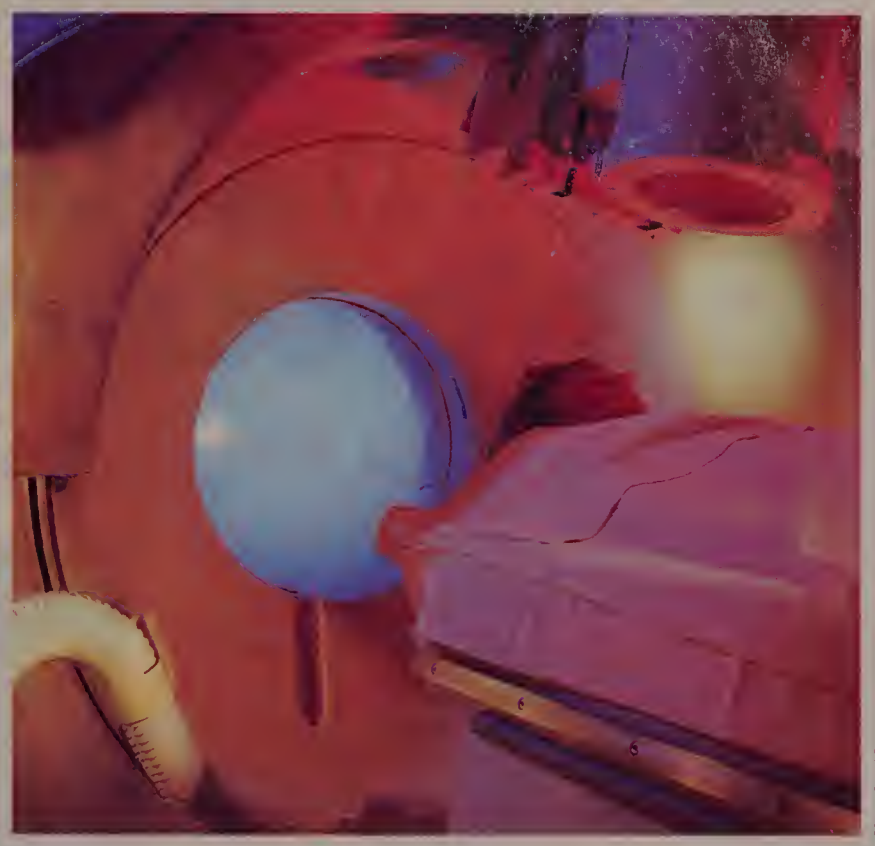
HiQ	Floating point (powers of matrix), 13.2; floating point (with I/O), 9.9; mixed integer/floating point, 2.0; pure integer (loop assignment), 3.1.
JMP	Import data (16,384 rows by 3 columns), 0.8; linear regression, 4.4; nonlinear regression, 3.3; plot large histogram, 4.8.
MATLAB	Pure integer (loop assignment), 2.5; floating point (with I/O), 3.0; mixed integer/floating point, 5.0; graphics, 2.6.
StatView	Import data (16,384 rows by 3 columns), 2.3; linear regression, 3.9; nonlinear regression, 3.9; plot large histogram, 2.6.
Sequencher	Open Sequencher file (33 fragments), 1.2; import 100 fragments, 1.3; align 33 fragments, 4.5; align 100 fragments, 4.4.
Mathematica	Mixed integer/floating point, 2.0; graphics, 2.9; integer (symbolic computation), 2.3; pure floating point (matrix), 3.9.
Data Desk	Import data (16,384 rows by 3 columns), 0.9; linear regression, 2.4; nonlinear regression (uses Transform), 4.2; plot large histogram, 1.2.
Maple V	Integer (symbolic computation), 1.1; pure floating point (matrix), 1.4; mixed integer/floating point, 1.1; graphics, 4.5.
IDL	Mixed integer/floating point (with I/O), 1.1; floating point, 2.0; graphics, 1.8.

BEHIND OUR TESTS

These tests represent a typical range of tasks performed in each application; we averaged three trials for each test to come up with the final results. The most significant speed improvements come from applications that take advantage of a floating-point unit. These include all CAD and modeling applications. Most disk-intensive tasks showed little, if any, improvement, and some even showed slower performance using the Power Mac versions because portions of the Macintosh Operating System have not yet been rewritten in native Power Mac code. Macworld Lab tested all the 680X0 applications on a Centris 650 with 40MB of RAM, with internal 8-bit video driving a 16-inch Apple monitor, and using an external 1GB Micropolis drive. System 7.5 was installed with standard Apple extensions and Adobe Type Manager. Disk cache was set at 96K, 040 cache was set to faster, 32-bit addressing was on, AppleTalk was inactive, and file sharing was off. All native Power Mac software was tested on a similarly configured Power Mac 7100/66. Modern Memory Manager was turned on and virtual memory was turned off. All application memory partitions were adjusted to take full advantage of each platform.—**Macworld Lab testing supervised by Danny Lee**



BRIAN SMALE



BRIAN SMALE

Sequencher Maps Technician Kristen Oberright of the Rockville, Maryland–based Human Genome Sciences uses Gene Codes' Sequencher for chromosome mapping, sequencing, and analysis projects.

Mathematica Biomodels Researchers at Massachusetts General Hospital use Mathematica to plot equations that help estimate measurement errors on CT scans of tumors.

world but it certainly changes the Mac's position in it. A Quadra, even an 840AV, is simply not in the running, computationally, against SPARC workstations, fully loaded 90MHz Pentium PCs, the Silicon Graphics Indy R4000, or DEC's Alpha series. The 8100 Power Macs will stand comparison with the fastest of these, and the 7100/66 travels right in the middle of this rather fast company.

For math purposes, the Mac is no longer an overpriced, very friendly computer—it's a cost-effective system that can replace Unix-based workstations. Therefore, computation-intensive problems such as finite-element studies in mechanical engineering or control-systems design in electrical engineering are now Mac problems, rather than jobs for the university or company computer center.

Vital Statistics

The Macintosh has had a strong following among statisticians for years, despite some complaints about slow graphics, especially for large 3-D data sets. With statistics on the Power Macintosh, there are no complaints at all. As an indication of the speed improvement in statistics on the Macintosh over the last few years, the data set we used only two years ago is no longer viable. At 5000 rows by three columns, it was simply too small to allow accurate timing—the results just reflected the time of a single screen refresh.

We looked at Data Desk 4.2 ($595, Data Description, 607/257-0100), StatView 4.1 ($595, Abacus Concepts, 510/540-1949), and JMP 3.1 ($695, SAS Institute, 919/677-8000). (Power Mac versions of the other leading Mac statistics programs—SPSS's SYSTAT and SPSS, and StatSoft's Statistica/Mac—are still in development.)

Still, it's remarkable how similar the improvements over 680X0 versions are for all three programs, particularly since they differ considerably in programming details. Abacus Concepts, for example, mainly converted StatView's computation routines to native code, on the assumption that users with big data sets were mainly interested in floating-point speed. Data Description, in contrast, converted almost everything to get at least small speed improvements in every aspect of the program (other than actions speed-limited by Apple's toolbox decisions).

One statistical function that provides a mostly floating-point challenge is linear regression. Power Mac versions of the three programs show approximately a 2.4- to 4.4-fold improvement over the 680X0 versions for this test. This demonstrates that the algorithms for computing regression statistics are well optimized.

In all three programs here, regression on a data set of 16,384 rows by three columns (the maximum allowed in Microsoft Excel, which we used for data preparation and storage) took less than three seconds. That means a middle-of-the-road Power Mac is capable of tackling Census Bureau–size data sets, with computation times for most statistical tests ranging merely into minutes. Power Mac 8100/110's can effectively replace the minicomputers that have been doing heavy-duty statistics since the 1970s.

Nonlinear regression and histogram plotting show Power Mac speed increases, in nearly all cases, by factors between 2.6 and 4.8. Bigger improvements are possible, but would have required far larger data sets than most users would encounter. Power Macs are approaching performance levels that will handle most scientists' statistical-computation needs for the foresecable future.

The Last Word

If you have a scientific computing task that relies mostly on floating-point arithmetic, a Power Mac is the answer to your prayers, delivering great floating-point throughput for a modest price. On most other tasks—likely to be mixed collections of integer arithmetic, floating-point computation, and assorted nonarithmetic data manipulation—our results show that a 7100/66 Power Mac is a bit less than three times as fast as a Quadra 650.

That may not seem earthshaking, but it represents much more than just a new price/performance category for the Macintosh. Power Macs can now replace the vastly expensive specialized hardware systems that serious research scientists have been forced to rely on. That's not just good for researchers' grant applications—it also allows more scientists to conduct the kinds of experiments that advance the fundamental understanding of our world. **m**

Contributing editor CHARLES SEITER is a consultant in biochemical-instrument design and author of *The Internet for Macs for Dummies* (IDG Books Worldwide, 1994).

No matter how fast can't outrun a power

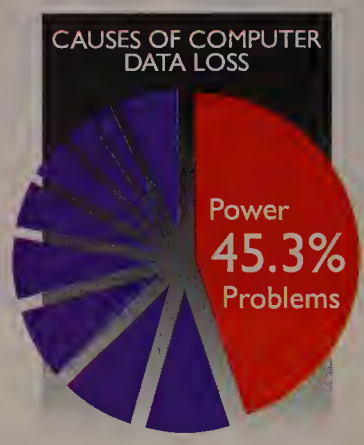
New Back-UPS: reliable power for your Mac

Just don't have the time for power problems on your Mac? Don't worry. They'll make time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes. You can't run, but you can hide, behind APC protection.

In the next three months, more than 30,000,000 PCs will be hit by power problems...

A study in a recent *PCWeek* showed that the largest single cause of data loss is bad power, accounting for almost as much data loss as all other causes combined. Every Mac plugged into an outlet is vulnerable. In fact, you have better odds of winning the lottery than escaping power problems. One study found a typical computer is hit 100 times a month, causing keyboard lockups, drive damage, or worse.

Simply put, if power problems are the least of your troubles, you've got one chance to keep it that way. You insure your car and home with the best policy you can afford. It just doesn't make sense to leave your Mac (which is at far greater risk) vulnerable to loss or damage.



Source: Contingency Planning



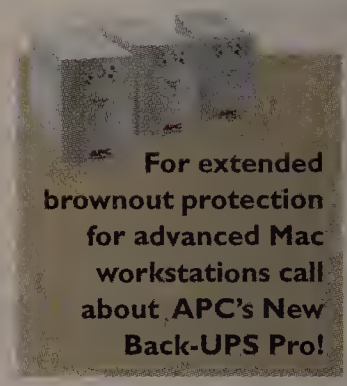
Source: Bell Laboratories

Power problems are the leading cause of computer data loss, while the most frequent type of power problems are undervoltages and blackouts, which surge suppressors alone are powerless to protect against.

Why a $119 APC UPS costs less than a $9.99 "surge protector"...

Contrary to most people's belief, a Mac alone has more protection built into it than a low-end "surge suppressor," which is usually nothing more than a well-packaged extension cord. In other words, going without protection is as good as under-spending on one of the most important computer decisions you'll make.

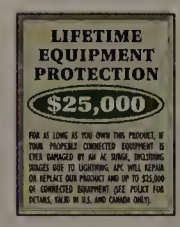
And since sags and blackouts represent more than 90% of power problems likely to hit your Mac, even quality, high-performance surge suppressors are literally powerless to protect your Mac from data loss.



That's why you need instantaneous battery backup power from an APC Uninterruptible Power Supply to prevent keyboard lockups, data loss, and crashes. With an APC UPS, you get six times the protection of a high-end surge protector for little more than twice the price. And $119 is much less expensive than false peace of mind.

Add APC's PowerChute* and you also get the security of graceful, unattended safe shutdown. Whether your running System 7.5 on your PowerMac, Quadra, IICI or on any other Mac system, PowerChute will shutdown your system and your applications in the event of an extended power failure.

APC UPSs carry up to a



$25,000 lifetime guarantee against surge damage to your properly

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Modern Press President Stephen Hopkins explains, "I protect my Mac Performa with a Back-UPS 400 and the unit works great. The Mac handles all bookkeeping, administrative and estimating functions for the company. It is a critical piece of my business. Unfortunately, we are located in an industrial park... a nice way of saying that our power fluctuates a great deal. After five years of reliable performance from my Back-UPS, power problems are no longer my concern. I can focus my energy on my business instead."



At Cellophane Square, Seattle's best known independent and alternative rock record store, Steve Marcus, Product Buyer, counts on APC to keep his Mac II SI and POS terminals running reliably. "The building where we started out was ancient and full of power problems. I lost lots of purchasing and product related information... until we invested in APC. I chose APC because they offer the most reliable product. I haven't been proven wrong yet. Problems continued in the building, but they were no longer a problem for us."



"We have over 30 APC units on our Macs," says Tim Girvin, principal of Tim Girvin Design, Seattle, WA. "Why do we protect every computer in the firm with an APC? As design consultants working on projects throughout the United States and Asia, 100% productivity is critical to project management. We cannot afford lost files due to power outages because of the complexity of many of the design programs we manage. Lost projects due to unprotected files is simply irresponsible. With APC in place, power problems are not even an issue, we are protected."

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PROTECT YOURSELF OR KICK YOURSELF...

It's been said that there are two types of computer users: those who have lost data, and those who are about to. Prevent the single largest cause of computer problems and join a fast-growing third category: those who protect their PCs with the most reliable protection they can buy: APC UPSs. So ask for APC at your favorite reseller. Starting at $119, an APC UPS is serious protection no Mac user should be without.

MacWEEK *"Ultimately, it's more a question of when - and not if - you should buy a UPS... UPS power protection has never been cheaper or more convenient"*

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Color Printers Mean Business

THE WHOLE OFFICE CAN NOW BENEFIT FROM THE IMPACT OF COLOR. MACWORLD LAB PICKS THE BEST PRINTERS.

by Jim Heid

Color printers are launching a takeover bid for your business. Historically, color machines have been relegated to specialized tasks, such as creating overhead transparencies for presentations or printing color diagrams for insertion into a laser-printed monochrome report.

A new generation of color machines is trying to change that limited role by offering the kind of speed and paper-handling flexibility that monochrome laser printers provide, enabling businesses to use color in places where it was often impractical: memos, reports, and other ordinary business documents.

It's a noble goal, but do the printers deliver? To find out, Macworld Lab put ten color office printers through a battery of performance and output-quality tests. We steered away from the low-end liquid ink-jet printers and the graphics-oriented dye-sublimation machines, focusing instead on technologies designed for business printing: thermal wax, historically the mainstay of color business printers; and color lasers—the newcomers, the big bruisers that are leading the charge in color business printing. We evaluated four of these color laser machines: QMS's MagiColor LX; Hewlett-Packard's Color LaserJet; the Xerox 4900 Color Laser Printer; and a preshipping model of Apple's first color laser printer, the Color LaserWriter 12/600. (We also tested a Tektronix color laser, the Phaser 540, but at press time the company replaced it with an enhanced model, the 540 Plus, that wasn't available for testing. In addition, we tested a new Tektronix machine, the Phaser 340, which uses an innovative variation on that company's solid-ink technology. We limited our testing to machines that could be attached via Ethernet, though we did make an exception for one of the Fargo printers because of its exceptionally attractive pricing.

The verdict? The current crop comes closer than ever to being able to handle everyday business printing chores as well as specialized color output such

Color Printer News Apple's first color laser printer, the Color LaserWriter 12/600 (bottom), is nicely designed, but it consistently produced errors. The Tektron IX Phaser 340 introduces a new solid-ink technology.

as transparencies. The color lasers and the Tektronix Phaser 340 can handle any type of office paper, from cheap copier bond to textured letterhead. And resolutions of 600 dpi and up enable them to do justice to text and graphics alike.

But even the best of the new breed isn't about to replace monochrome laser printers (see "Top Office Printers," *Macworld*, June 1995). One reason is cost. It's easy to find a monochrome workhorse for between $2000 and $3000, while color machines of acceptable quality start at around $4000. Another reason is speed. That monochrome workhorse will gallop at 10 or more pages per minute, but even the fastest color machine trots at only a few color pages per minute. And although the color lasers tested delivered good- or excellent-looking black text, most still don't measure up to high-resolution monochrome machines.

Four Times the Work

One reason color printers are slower and costlier than their monochrome counterparts is they have more work to do. While a monochrome printer applies just one pigment (black) a color printer must apply four (cyan, yellow, magenta, and black).

A thermal-wax printer uses a roll of pigmented wax that looks a bit like colorful plastic wrap. The roll is divided into successive panels of cyan (C), magenta (M), yellow (Y), and black (K) ink. (Many printers also accept three-color rolls and simply combine C, M, and Y ink to make black; this speeds printing a bit but produces somewhat muddy blacks.) As a page prints, the roll advances for each pigment, which is applied to the paper by a print head containing thousands of heating elements. In the Seiko and Fargo printers, the paper appears in the output tray and then gets pulled back in for the second, third, and fourth color passes. In the other thermal-wax machines tested, the page wraps around a drum, which rotates for each pass. The drum method tends to be faster and allows for a less-complex print engine but limits page length to 11 inches; the Seiko machines can print on legal-size stock, but the Fargo printers can't.

Color laser printers work similarly to their monochrome siblings, relying on toners—fine plastic powders—that are attracted to the page. The engine applies all four toner colors to the printer's photoconductive drum or belt and then transfers them to the paper in one pass. As in a monochrome laser printer, the paper then passes through a pair of fusing rollers, which use heat and pressure to fix the toner to the page.

The mechanism in Tektronix's Phaser 340 is a horse of a different color. Like Tek's publishing-oriented Phaser 300i, the Phaser 340 uses solid ink sticks—waxy, crayonlike affairs that are melted inside the printer's engine. But the Phaser 340 applies those inks to a rotating, heated drum, which then transfers them to the paper (see "Innovative Technology for Color Laser").

Regardless of the printing technology, it takes longer to apply four pigments than to apply one; it also takes longer for the printer to calculate how much of each color to apply. In PostScript printers—which make up the majority of machines tested—this process is performed by a printer's built-in PostScript controller, a computer unto itself. Indeed, because PostScript printers require memory to store the page image, color machines often contain a dozen or more megabytes of RAM, many times the amount needed by a monochrome laser. There goes the cash register again.

Printer Setup

Color laser printers also require four times the work to set up. You must install four toner cartridges, an imaging cartridge or belt, and a developer cartridge or bottle. The whole process takes a good half hour. After that, you replace these consumables at varying intervals—an Apple Color LaserWriter toner cartridge, for instance, lasts for roughly 4000 pages, while the imaging cartridge lasts for 10,000.

We found Apple's Color LaserWriter the easiest to set up; its Canon-built print engine uses the fewest components. The HP Color LaserJet uses more components, with many little plastic loops, foam pads, tape strips, and doodads to remove,

Innovative Technology for Color Laser

Two recent technology innovations give color laser printers, such as Apple's new machine, much better control over toner placement. The result is more accurate prints.

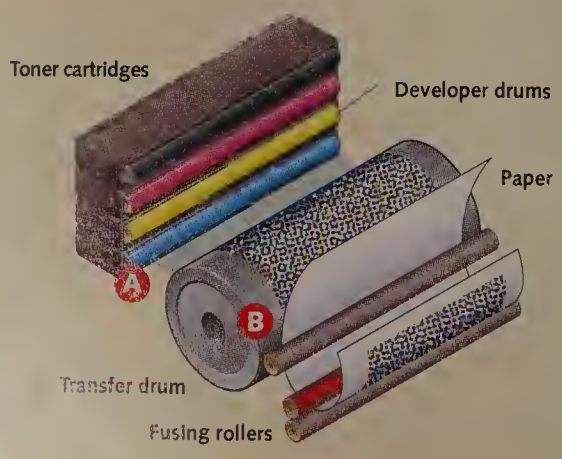
BETTER REGISTRATION

The colored toners from the four **developer drums** collect on a metal **transfer drum** or belt **(A)**, which deposits all four together on the paper **(B)**. This method provides great control over color registration. Printers using older technology deposit colors one at a time on the paper. The paper can stretch and shift between color passes and distort the image.

BETTER TONER

The other major innovation is the switch from dual-component toner to mono-component toner. Mono-component toner holds a strong electrical charge so that it adheres to the **transfer drum** or belt **(C)** without special carrier particles, which dual-component toner requires. The new toner lies flat and even on the surface of the transfer drum and moves to the paper with great accuracy **(D)**.

The older, dual-component, toner technology requires coarse, electrically charged **carrier particles** to hold the much finer **color toner** to the transfer drum **(E)**. Toner particles wrap themselves around the carrier particles; the irregular surface and range in distances from toner to paper causes the toner to scatter as it makes the leap to the paper **(F)**.



Mono-component toner (detail of B)



Toner particles
(diameters: 7 microns)

Dual-component toner (mechanism not shown)

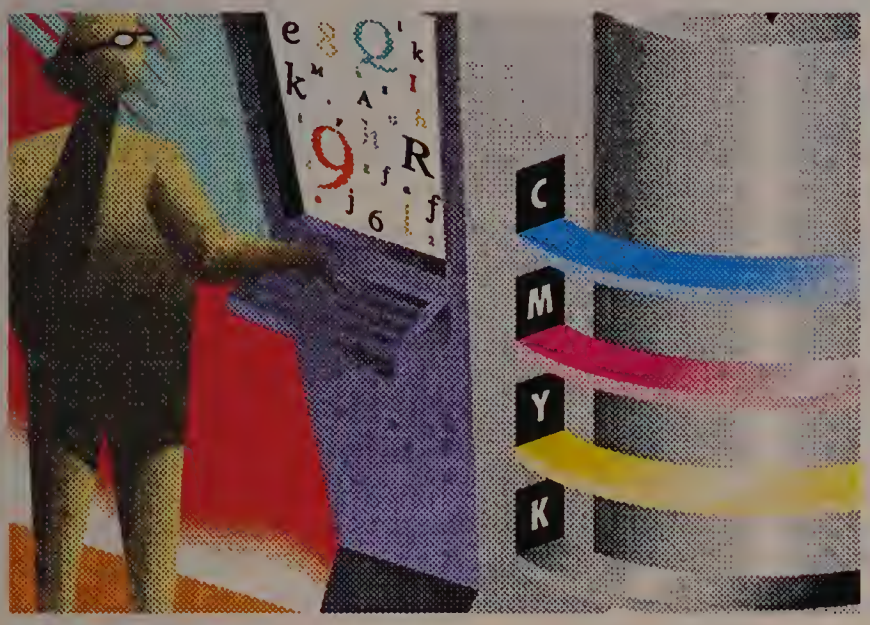


Carrier particles
(diameters: 100 microns)

Toner particles
(diameters: 10 microns)

Color Image Quality

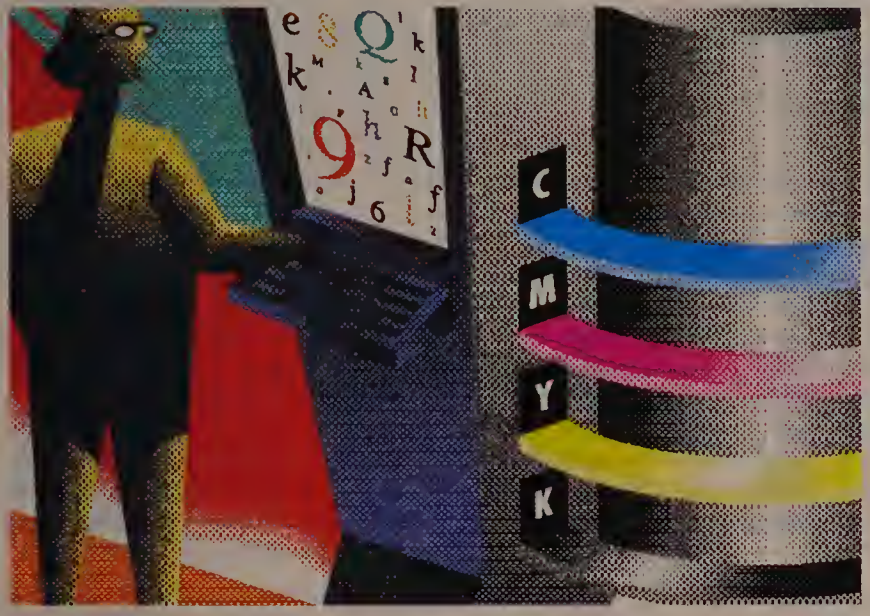
Macworld Lab's PostScript test image comes out looking anywhere from awful to pretty decent. The Tek offset solid-ink printer's relatively faithful reproduction of colors is marred by grainy textures and streaky blends, while the Xerox color laser produces smooth transitions and crisp edges but deep and somewhat oversaturated colors. The General Parametrics thermal-wax printer suffers from mysterious horizontal lines, blends reduced to stripes, and reds that pop off the page. With equally unacceptable results, the Hewlett-Packard color laser produces very coarse dot-patterns and lends a pastel cast to all colors, making output resemble a sandpainting. With the ROM that Apple told us contained final code, the Apple color laser produced smooth blends, clean edges, and relatively faithful colors, but it couldn't shake bugs that introduced trapping errors and replaced the gray cylinder's white highlight with a black bar. Note that all printers were run in default settings. Color-calibration or other color-management methods would improve fidelity; some printers would show more improvement than others. (All printers tested include serviceable or better color-matching software.) The original image is a Pressmatch color-laminate proof.



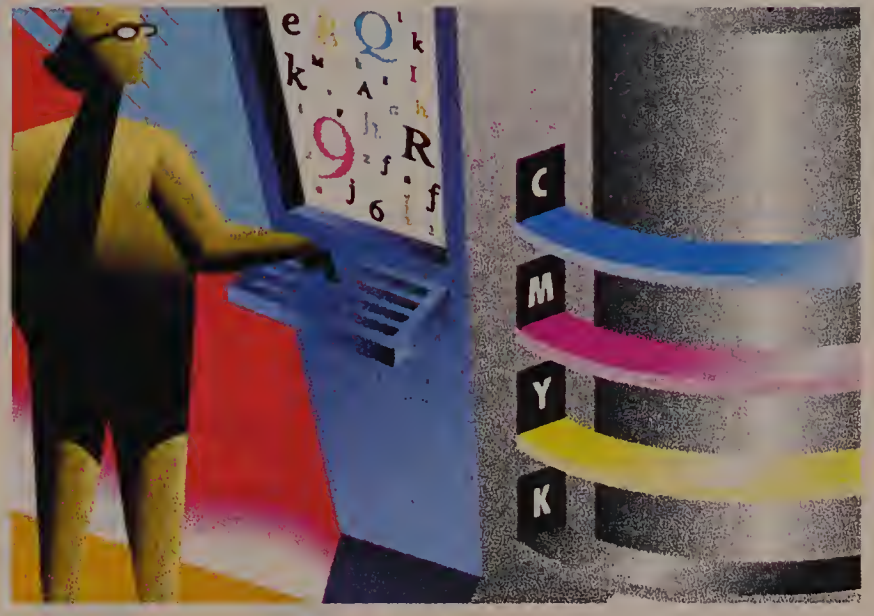
Tektronix Phaser 340



Xerox 4900 Color Laser Printer



General Parametrics SpectraStar GTx



Hewlett-Packard Color LaserJet



Apple Color LaserWriter 12/600



Original Image

shake, slide, invert, or insert at various phases. The HP printer makes it easy to cause a messy spill: just add toner to a hopper that isn't quite empty or squeeze a toner bottle as you empty it into the printer. The Color LaserWriter relies on slide-in toner cartridges that will look and feel familiar to anyone who's fed a monochrome laser printer or photocopier. The QMS and Xerox machines use the same Hitachi-built print engine and fall between the HP and Apple machines in ease of setup.

Setting up a thermal-wax printer is a breeze: simply install the ink ribbon. (If security is an issue, don't forget that the spent ribbon contains a negative image of every page you print.) The solid-ink Tektronix Phaser 340 is equally easy to restock and more fun: the ink sticks for each color have a unique shape that prevents you from inserting them in the wrong chamber (see "Smart Designs"). Any kid with Fisher-Price experience can replace the ink in this machine.

The kid will learn a valuable lesson in patience, too, because the Phaser 340 takes about 15 minutes to melt its inks and prepare for printing—even if you just turn it off to reset it or the power flickers momentarily.

Paper for Color

One of the classic complaints about color printers has been their inability to handle the same range of paper stocks a monochrome machine can use. Color-laser and solid-ink technologies break down these barriers—or at least most of them.

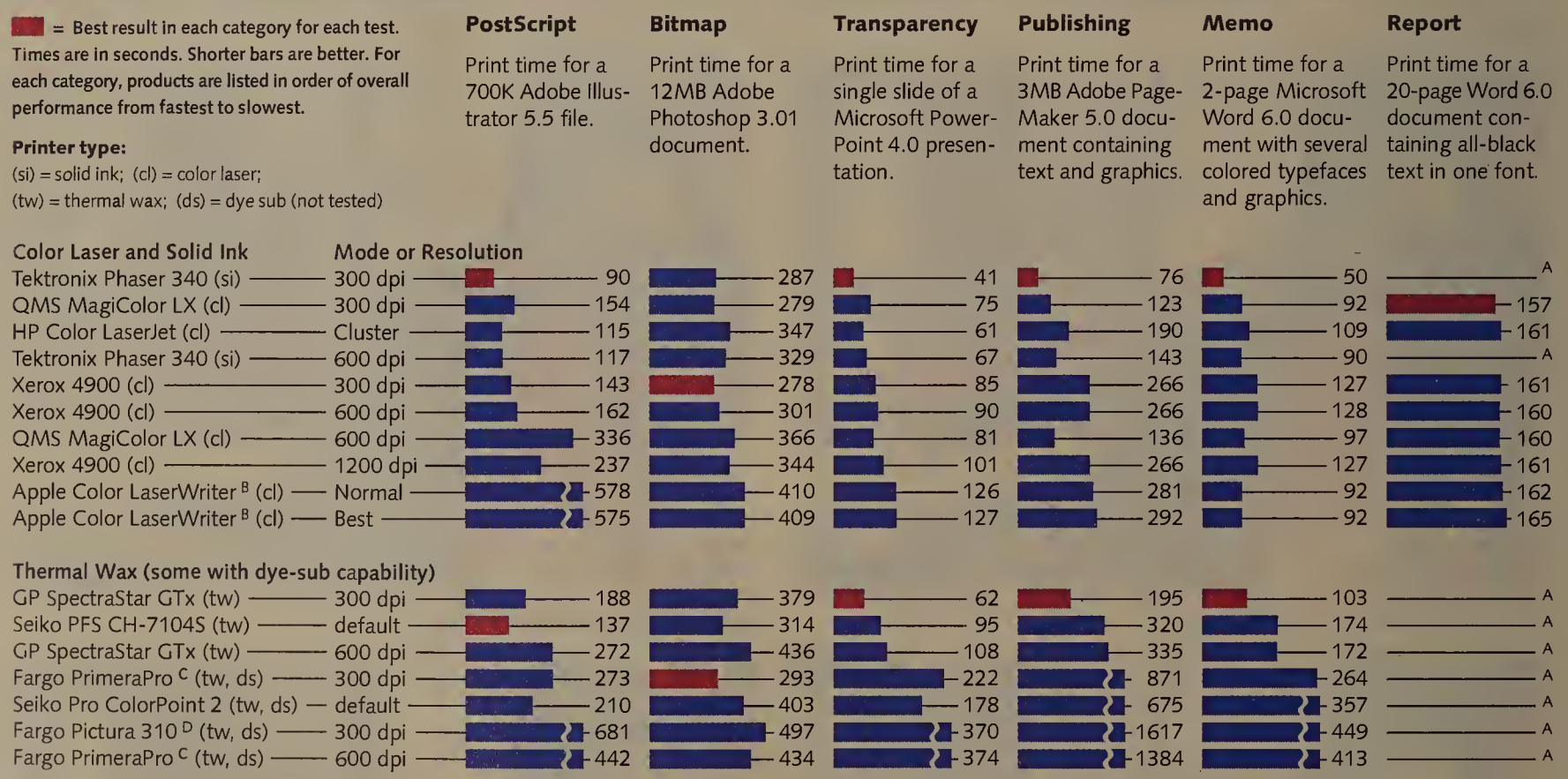
All the printers tested provide at least one paper tray for cut-sheet paper; gone are the days of color printers that use roll-fed paper and cutting-blade mechanisms. The HP Color LaserJet, General Parametrics SpectraStar GTx, Tektronix Phaser 340, Xerox 4900, and QMS MagiColor LX also accept optional second trays that expand paper capacity and make possible special printing gymnastics, such as printing the first page of a document on letterhead and subsequent pages on blank sheets. And all machines except for the SpectraStar GTx and PrimeraPro provide a manual-feed slot for transparency film or other special stocks. Of the printers tested, only the QMS MagiColor LX and Xerox 4900 can print envelopes.

Color laser printers, as well as the Tektronix Phaser 340, deliver excellent results on typical copier bond and letterhead stock—no need for special paper that won't match the rest of the pages in a report. However, the Phaser 340's ink formulation prevents double-sided printing. None of the printers tested support a duplexer—an internal mechanism that flips pages to print on the second side, a common option in high-end monochrome lasers—but the color lasers do let

MW LAB Color Business Printers: How Fast?

= Best result in each category for each test. Times are in seconds. Shorter bars are better. For each category, products are listed in order of overall performance from fastest to slowest.

Printer type:
(si) = solid ink; (cl) = color laser;
(tw) = thermal wax; (ds) = dye sub (not tested)



A Inappropriate use of printer. B Beta unit tested; final performance may differ. C Connected using LocalTalk-to-Ethernet converter. D Connected using parallel-to-NuBus converter.

BEHIND OUR TESTS

Macworld Lab tested each printer's speed with a variety of documents designed to measure performance on real-world printing tasks. Solid ink and color laser, two new and directly competing technologies, are shown together; the thermal-wax printers, some with optional dye-sublimation support, are shown separately.

The Illustrator file tests the performance of the printer's PostScript controller. The Photoshop file measures the printer's ability to handle large bitmapped images, as well as its network interface. The PowerPoint test looks at a primary business use for this class of color printer. The PageMaker test demonstrates the overall performance of the printer dealing with a typical publishing job. The logos and numerous type sizes, typefaces, and type colors in the 2-page Word document test the printer's ability to render fonts and simple graphic elements. The 20-page Word document tests for the print engine's overall speed.

Macworld Lab ran all tests on a Centris 650 with 16MB of RAM and an internal 230MB hard disk running System 7.5 and a LaserWriter 8.2 driver. Except for the Fargo Pictura 310, which used a NuBus-to-parallel adapter, and the Fargo PrimeraPro, which used a LocalTalk-to-Ethernet adapter, we tested the printers via EtherTalk.**—Macworld Lab testing supervised by Mark Hurlow**

Smart Designs

Each generation of printer technology confronts printer designers with new quirks and offers new opportunities to differentiate their products. While testing the color printers for this article, we looked for smart solutions to problems new and old.



Toner Torpedoes The Apple Color LaserWriter's four toner cartridges slip into color-coded tubes that rotate on a central spindle.



Paper Management A mechanical indicator on the Color LaserWriter's paper tray shows how much paper remains in the tray.



It's a Copier Too The optional Copy-Station scanner attaches to the Tek printer's SCSI port to add the functionality of a color photocopier.



Playing With Blocks Each colored solid-ink block for the Tektronix Phaser 340 has a different shape and can only fit in the appropriate inkwell.

you manually print on both sides.

Thermal-wax printers are still finicky about paper. Thermal-wax technology benefits from extremely smooth paper; a sheet of copier bond or textured letterhead has pits that prevent the wax from adhering. All thermal-wax vendors sell special, ultrasmooth paper that provides excellent results. The Sharp-built print engine used in General Parametrics' SpectraStar GTx accepts a special ink ribbon that sacrifices its black panel in favor of a primer medium. Primer is applied to areas of the page that will be printed with ink. The primer attempts to smooth the paper's rough surface, but it is only effective on high-quality plain paper that's relatively smooth to begin with, such as Hammermill Laserprint. With typical photocopier bond, output is mottled. Thermal-wax machines remain best suited for creating transparencies and printing on their own special paper.

Three of the thermal-wax machines tested—Seiko's Professional ColorPoint 2 and Fargo's PrimeraPro and Pictura 310—can double as dye-sublimation printers, producing photo-realistic, continuous-tone prints, including gorgeous transparencies. Of the three, the Seiko does the best job of straddling the thermal-wax and dye-sublimation technologies: besides delivering superior output quality, the Professional ColorPoint automatically senses which type of ribbon you've installed. The Fargo machines require you to check a dialog-box option; if you forget, the paper jams. Also, we found that the Fargo machines' color balance was significantly different in each mode. You wouldn't want to use their thermal-wax prints to tweak color balance if you planned to print the final proof in dye-sub mode.

The Fargo machines have additional drawbacks. They were among the slowest printers we tested, and they lack built-in PostScript, relying instead on a nicely designed QuickDraw-based driver. Fargo sells PostScript-interpreter software—a version of Adobe's Configurable PostScript Interpreter, or CPSI—at $795 for the Pictura and $399.95 for the PrimeraPro. CPSI runs on the Mac to which the printer is connected, so its performance depends on the Mac's. A native Power Mac version of CPSI is not yet available for the Fargo printers.

Still, the PrimeraPro and Pictura 310 have their appeal. The $1895 PrimeraPro was by far the least expensive printer we tested, and the $4995 Pictura 310 is the only tabloid-size dye-sublimation printer you'll find for less than $5000—or less than $10,000, for that matter.

Output Quality: Getting Better

In past years, most business color printers had a relatively coarse resolution of 300 dpi. Six of the ten machines tested provide at least 600-dpi or 600-by-300-dpi modes. Of the color lasers tested, most provide 600 dpi or higher resolutions (the HP provides 300 dpi). The Xerox 4900 Color Laser Printer provides a 1200-by-300-dpi mode. In this mode, the printer's laser beam pulses four times as fast as in 300-dpi mode, enabling the printer to apply four times the number of dots in the horizontal direction.

Many machines also employ resolution-enhancement techniques—fine-tuning dot sizes, for example—to further improve the quality of text and scanned images. The Color LaserJet provides HP's Resolution Enhancement technology, for example, while the Apple Color LaserWriter employs Color PhotoGrade.

The trend toward higher resolutions pays off on paper. This year's machines produced the best-looking output we've seen in this product category.

To evaluate output quality, Macworld Lab assembled a jury of 11 *Macworld* staffers from the editorial and art departments. Because different types of documents tax a printer in different ways, we compared a scanned image printed in Adobe Photoshop, an illustration created in Adobe Illustrator, and a text document created in Microsoft Word.

In the scanned-image test, the top three finishers were Apple's Color LaserWriter, Tektronix's Phaser 340, and QMS's MagiColor LX. The Color LaserWriter earned high marks for color accuracy and detail (see the output samples in "Color Image Quality"). The Phaser 340 output, by contrast, seemed a bit oversaturated—artificially bright. Our least favorite results in this test came from the HP Color LaserJet (which earned comments such as "grainy," "fuzzy," "detail lost"), both Seiko ColorPoints ("colors way too dark," "muddy looking"), and the General Parametrics SpectraStar GTx ("grainy and streaky").

In the Illustrator test, Xerox's 4900 Color Laser Printer took first place, although many of our jurors complained about oversaturated colors. QMS's MagiColor LX finished second, with Apple's Color LaserWriter finishing third. Last-place finishers here: General Parametrics' SpectraStar GTx, Fargo's Pictura 310, and Fargo's PrimeraPro.

In the text-output tests (which involved both black and color text), Apple's Color LaserWriter regained first place, followed by Tektronix's Phaser 340 and Xerox's 4900. HP's Color LaserJet and Seiko's ColorPoint 2 and Profession-

Colorful Business: Comparing Color Printers

Company	Phone	Product	Imaging Technology	Tested by Macworld Lab	Price (list/company's estimated street) [A]	Ports (standard/ optional/ all active)
Apple Computer	408/996-1010, 800/538-9696	Color LaserWriter 12/600 [C]	color laser	yes	$6989/$6500	L, P, E/none/yes
Digital Equipment Corporation	508/493-5111, 800/777-4343	DECcolorwriter 1000	thermal wax	no	$3999/NP	L, P, S/E/yes
Fargo	612/941-9470, 800/327-4622	PrimeraPro	thermal wax and dye sublimation	yes	$1895/$1499	L/E/no
		Pictura 310	thermal wax and dye sublimation	yes	$4995/$3995	P/none/NA
General Parametrics	510/524-3950, 800/223-0999	SpectraStar GTx	thermal wax	yes	$3995/$3795	L, P, S/E/yes
Hewlett-Packard	208/323-2551, 800/752-0900	Color LaserJet	color laser	yes	$8832/NP	E, L, P/T/yes
NEC Technologies	508/264-8000, 800/632-4636	SuperScript Color 3000M	thermal wax	no	NP/$999	P/none/NA
QMS	205/633-4300, 800/523-2696	MagiColor LX	color laser	yes	$4999/NP	L, P, S/E, T/yes
Seiko Instruments	408/922-5900, 800/888-0817	Professional ColorPoint 2 [E]	thermal wax and dye sublimation	yes	$16,499/$13,199	L, P, S/E/yes
		ColorPoint 2	thermal wax	yes	$4999/$3999	L, P, S/E/yes
Tektronix	503/682-7377, 800/835-6100	Phaser 240	thermal wax	no	$3695/NP	L, P/E, T/yes
		Phaser 340	solid ink	yes	$5590/NP	E, L, P/T/yes
		Phaser 540 Plus	color laser	no	$9835/NP	E, P/T, L/yes
Xerox	716/423-5090, 800/349-3769	Xerox 4900 Color Laser Printer	color laser	yes	$6100/$5500	L, P, S/E, T/no

I = LocalTalk; P = parallel; S = serial; E = Ethernet; T = Token Ring. NA = not applicable. Technical-support ratings are based on a series of calls made to each company by Macworld staffers posing point system, including bonuses and demerits, to derive the final rating. Ratings are for companies, not individual products, and we call only those companies whose products Macworld Lab tests. and solid-ink printers use additional consumables with long duty-cycles, such as 10,000 pages. For thermal-wax printers, page yield listed is for three-color ribbons; four-color ribbons print fewer ColorPoint 2 PSF Model 14, a tabloid-size, thermal-wax-only machine, for $8499 ($6799 estimated selling price). [F] No tech support provided without serial number.

al ColorPoint 2 finished last. But note that our jurors' criticisms of the Color LaserJet dealt primarily with color text; the machine does an excellent job with black text.

Another factor influences appearance, and it's something our output samples can't show: the finish on the page. In thermal-wax output, areas where pigment has been applied have a high-gloss shine. The Tektronix Phaser 340's solid-ink output is less glossy but still has a shine to it.

As for the laser printers, the finish depends on the engine. The QMS and Xerox machines produce a semiglossy finish, but the edges of characters and of shapes (such as the bars in a chart) have a slightly fuzzy, out-of-focus appearance. The Apple Color LaserWriter is less glossy and doesn't suffer from this fuzziness. And the HP Color LaserJet produces a matte finish identical to that of a monochrome laser printer. Indeed, with a document containing only black text and line art, it's impossible to tell the Color LaserJet's output from that of a monochrome laser printer.

Generally, finish is a matter of personal taste—just as some people prefer glossy photos and others prefer matte finish. However, if you want to include color pages with a document printed on a monochrome laser or photocopier and you want a consistent finish throughout, you might lean toward the HP Color LaserJet, the only printer whose pages don't shout, "I was printed on a different type of printer!"

Another factor that may influence your choice is the cost per page. Laser and solid-ink printers are very economical for printing pages that are mostly blank—most manufacturers base their consumables' replacement intervals on pages where only 5 percent of the area contains pigment. Thermal-wax output is costlier with such documents because the printer uses an entire set of ink panels for each page regardless of whether it uses each color or not. For transparencies, however, which typically use color backgrounds and thus have much higher coverage percentages, thermal-wax machines are often more economical.

Slow Times

Thanks to controller improvements—faster processors, improved memory-management schemes, and optimized PostScript interpreters—and to faster engines, the latest batch of color printers is the fastest we've ever tested. Finishing first: the Tektronix Phaser 340, whose controller delivers exceptional performance with PostScript illustrations and typographically complex jobs. (In 300-dpi mode, for example, the Phaser 340 was 42 percent faster than the second-place QMS MagiColor LX in our Illustrator test and 46 percent faster in our fonts test.) HP's Color LaserJet finished a close third in overall performance, with Xerox's 4900 Color Laser Printer coming in next.

But overall performance doesn't tell the whole story: a printer that excels at one type of job might fall flat in others. The Xerox 4900 is a good example. In our PageMaker and fonts tests, it was near the bottom of the list. In the Photoshop test, however, it was among the fastest. As you peruse our performance results (see "Color Business Printers: How Fast?"), be sure to look for the printers that best handle the types of documents you create.

We ran another performance test on the color laser printers. To gauge how they'd fare as workgroup printers—and because no office needs color in every document—we printed a 20-page black-and-white text file. Surprisingly, the range in performance was negligible, with the fastest printer tested completing the task in 157 seconds and the slowest in 165 seconds.

And those times aren't exactly neck-snapping—in our June 1995 roundup of monochrome workgroup printers, Apple's $2299 LaserWriter 16/600 PS printed the identical document in about two-thirds the time.

Resolution (in dpi)	Paper Capacity in Sheets (base/maximum)	Consumables (Cost), Page Yield [B]	Technical Support
600 × 600	250/500	toner (C, M, Y $139), 4000; toner (K $119), 4000	not rated [C]
600 × 300	100/200	ink ribbon ($165), 342	not rated
600 × 300	50/50	thermal-ink ribbon ($45), 115; dye-sub ribbon and paper ($279.95), 100	very good
300 × 300	65/65	thermal-ink ribbon ($62.95), 50; dye-sub ribbon and paper ($239.95), 50	very good
600 × 300	100/200	ink ribbon ($155), 342	acceptable
300 × 300	250/500	toner (C, M, Y $43.95), 2200; toner (K $8.95), 2200	unacceptable
300 × 300	50/50	ink ribbon ($55), 107	not rated
600 × 600 [D]	250/500	toner (C, M, Y $99), 3000; toner (K $60), 4000; fuser oil ($35), 3000	acceptable
300 × 300	100/100	thermal-ink ribbon ($490), 1160; dye-sub ribbon (A size, $170; B size, $392), 100	very good
300 × 300	100/100	ink ribbon ($490), 1160	
600 × 300	100/200	ink ribbon ($660), 1368	very good
600 × 300	250/750	ink sticks (box of C, M, Y $79), 1000; ink sticks (K $29), 1000	
600 × 300	250/700	toner (C, M, Y $199), 6500; toner (K $179), 7500	
1200 × 300	250/500	toner (C, M, Y $200), 4000; toner (K $45), 4000	not rated [E]

as customers to gauge the accessibility, helpfulness, and accuracy of the company's support technicians. Macworld uses a [A] *Actual selling price could be higher or lower than company's estimated street price. NP = not provided by company.* [B] *Laser pages.* [C] *Prerelease unit tested, couldn't rate tech support.* [D] *Requires 24MB of memory for 600 dpi.* [E] *Xerox also offers the*

The Last Word

The most impressive machine this time around is Tektronix's Phaser 340, which offers first-place performance, excellent output quality, plain-paper capability, and easy maintenance. The printer isn't a perfect office-mate—it can't print legal-size pages or envelopes and its 15-minute warm-up time can get old—but it does provide the best mix of features, output quality, and performance. If you want a color printer that's as easy to use as a monochrome laser, this is the one to buy.

The Phaser 340 also accepts an optional attachment that turns it into a color photocopier. The $1695 Phaser CopyStation is essentially a scanner that connects to the Phaser 340's SCSI port. It's a nice way to make a good printer even better.

Although thermal-wax machines lack the paper-handling versatility of the color lasers and the Phaser 340, they still have their place. They produce beautiful overhead transparencies, and they cost less than competing technologies. In this category, General Parametrics' $3995 SpectraStar GTx delivered solid performance and good text quality, although our jury preferred the graphics output of the the Seiko ColorPoints. (Tektronix is revamping its thermal-wax product line as this issue goes to press; the Phaser 240, which uses the same Sharp-built engine as the SpectraStar GTx, should be available by the time you read this.)

As for the laser printers, it's hard to pick a winner—not because all the machines are so good, but because each has significant flaws. The Apple Color LaserWriter is the easiest to use and produces the best output, but can be painfully slow. (We tested a prerelease model; however, the unit we tested contained the final version of the PostScript controller. And even with the final ROM and extra memory, the Color LaserWriter made errors on a particularly complex PostScript document that the other printers were able to get through accurately.) The QMS and Xerox machines are fast and can print envelopes, but they're harder to set up and maintain and their output isn't as good. The HP LaserJet performs well and has the matte finish laser printer veterans are used to, but its output quality falls short of the Color LaserWriter's. HP's technical support was unacceptable in our tests. We were unable to evaluate Xerox's and Apple's tech support.

As for Tektronix's newest color laser, the Phaser 540 Plus, it looks like a contender. We couldn't test a unit, but Tektronix supplied us with impressive output samples of scanned images showing virtually no halftone or dither patterns. The $9835 Phaser 540 Plus provides 600-by-300-dpi resolution and uses fewer consumables than the other color lasers we tested—besides the toner cartridges, the only consumables are an imaging unit and fuser unit, which both last 30,000 pages. The 540 Plus also accepts the CopyStation photocopier option.

At press time Xerox announced three new color lasers that should be shipping by the time you read this. The XPrint series is rated at 3 ppm for color and 12 ppm for black and white. The 4920 and 4925 models provide 600-dpi resolution; the 4915 prints at 1200 by 300 dpi. Pricing was not finalized at press time.

Normally, this would be the point where I'd say that someday every printer will be a color printer. At the low end, that day has by and large arrived—printers such as Apple's $379 Color StyleWriter 2400 can ably handle both monochrome and color. But in the rest of the market, color printers will play second fiddle to monochrome machines for the foreseeable future. Monochrome laser printers are becoming faster, sharper, and cheaper more quickly than are color machines, and it remains to be seen how many businesses decide color is worth the cost and performance penalties.

That doesn't mean there hasn't been solid progress in business color. Today's printers are better than ever, and the best of them come closer than ever to meeting not only specialized color-printing needs, but ordinary ones, too. If you've got the checkbook and the room, take the plunge. Just don't plan to put your monochrome workhorse out to pasture. **m**

Contributing editor JIM HEID has covered printers for *Macworld* since 1984. The fourth editor of his BMUG Choice–award-winning *Macworld Complete Mac Handbook Plus Interactive CD*, (IDG Books Worldwide) will be available in August.

COLOR PRINTERS FOR BUSINESS

MW EDITORS' CHOICE

For general-purpose office use, perfect color is less important in a color printer than efficiency and convenience.

Tektronix Phaser 340 Speed, great output quality, and foolproof setup are three good reasons to buy this innovative printer. An optional photocopy attachment and very good technical support are two more. **Company:** Tektronix. **List price:** $5590.

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Show your plan

Show who

What

When

Where

How

Things will get done.

THINGS CHANGE

You compare

Your new plan

To the original.

You ask What if?

You get answers.

You make progress.

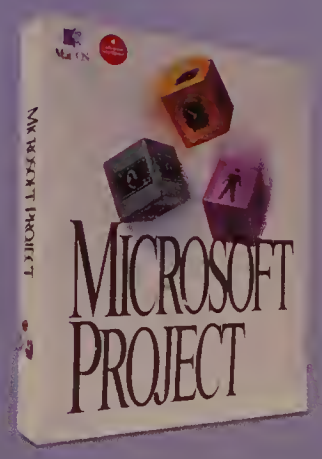
GET GOING

Show how much

Progress has been made

Show everyone

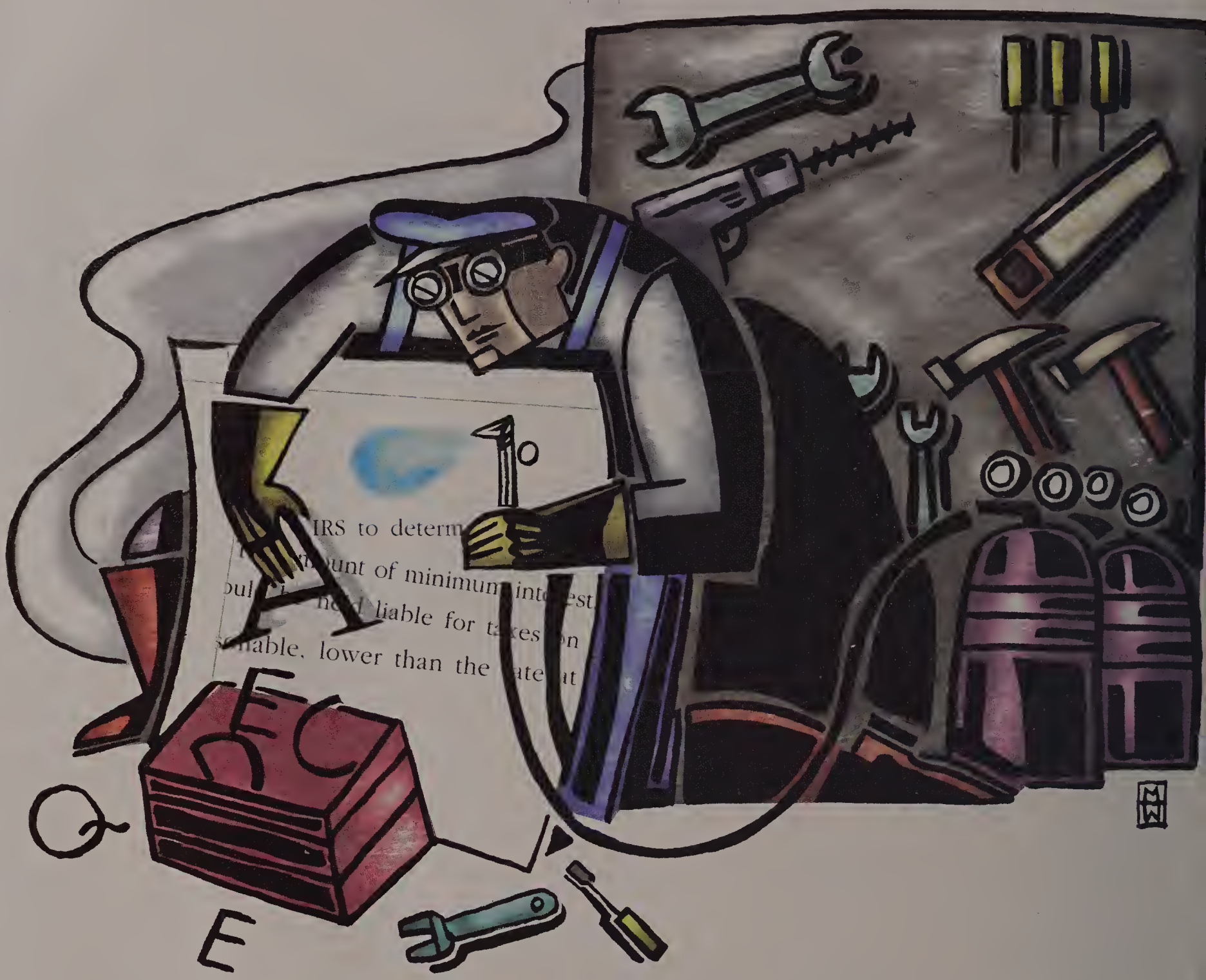
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EXPERTS PICK THE BEST UTILITIES TO MAKE THE MOST OF QUARKXPRESS AND PAGEMAKER

Push Past

Just as extensions enhance the power of the Macintosh Operating System, so XTensions and plug-ins make it easy to add the functions to QuarkXPress and Adobe PageMaker that the developers forgot. By taking on specialized tasks, these utilities reduce the pressure on XPress and PageMaker to include every function, and thus keep them from becoming slow and unwieldy behemoths like Microsoft Word 6. And no doubt about it, the right XTensions and plug-ins can be major productivity boosters, condensing as much as an hour's worth of work into a 15-second reply to a dialog box.

A Paucity of Plug-ins

PageMaker plug-ins (formerly known as Additions) pale in comparison to XPress XTensions in both number and diversity. This is partly because Aldus, PageMaker's original developer, was slow

to introduce plug-in technology. Additionally, many PageMaker users believe that the basic functionality of the application is enough for their needs and that plug-ins are unnecessary. For most users, however, both PageMaker and XPress have their failings, and plug-ins and XTensions can do a great deal to rectify these shortcomings.

PageMaker and XPress come with small collections of such add-ons that users shouldn't overlook. (PageMaker pros especially recommend Drop Caps, Expert Kerning, Find Overset Text, PSGroupIt, and Printer Styles.) A multitude of third-party plug-ins and XTensions add yet another level of features and options.

But one could go bankrupt buying everything that sounds appealing. Thus, I polled a number of XPress and PageMaker experts to find out what they use. Although the list of their favorites is long and remarkably diverse, a few were cited repeatedly; those are the ones I look at here. Desktop publishers who have yet to discover the power of XTensions and plug-ins will find much of value in this collection. Even more-experienced XPress and PageMaker users, however, should find significant money- and time-savers they have so far overlooked (see the sidebar "Hot New XTensions and Plug-ins").

The business of purchasing XTensions and plug-ins is very convenient, as two clearinghouses—XChange (303/229-0620) for XTensions, and Adobe Plug-in Source (206/489-3446) for plug-ins—handle all sales. Two free XTensions, Bobzilla and Thing-a-ma-Bob, are available from online services like America Online and CompuServe. For vendor and pricing information for all the utilities mentioned here, see the table, "XTensions and Plug-ins."

Tools for PageMaker Pages

Topping almost every PageMaker expert's list is a collection of ten plug-ins called PageTools 1.0 (see *Reviews*, *Macworld*, December 1994). Although different people respond to PageTools' parts differently, almost everyone likes PageBar, which gives PageMaker a button bar much like Microsoft Word's (see "Who's Got the Button?"). PageGuides, another popular PageTools plug-in, copies guides from page to page, applies them to objects, and deletes guides on one page or all pages. PageAlign makes it easy to align objects according to a variety of options. PageMover quickly moves objects to a different page or to the pasteboard. PagePrinter prints only pages that have changed since the last print job. And PageColor searches for and changes colors.

Few appreciate PageMaker's bad habit of allowing file sizes to mushroom over time to well beyond what is actually necessary. Zephyr CleanSweep 1.01 is thus a favorite among PageMaker power users because it locates all publications that are needlessly obese and, while you're on a coffee break, removes all the wasted space. CleanSweep is also available as part of a trio of plug-ins called Zephyr Essentials, which includes another well-regarded plug-in, Zephyr Grids, which simplifies creating and copying complex page grids.

Zephyr SuperSnap 2.0.1 is popular for its enhancements to PageMaker's Snap-to functions. In addition to the familiar snapping of object edges to guides, SuperSnap can snap the centers of objects to guides and snap objects to other objects. It can also snap to a grid (PageMaker's or one specified in SuperSnap), nudge items by a customizable distance, and undo its last action (something many plug-ins can't do).

Galley Oops 2.2 helps many pros find last-minute problems. It looks for the sorts of errors that spelling and grammar checkers tend to miss—multiple spaces, multiple punctuation marks, mismatched quotes and brackets, quotation marks that fail the "smart" test, and numbers that should be spelled out or punctuated (see "Artificial Proofing"). This plug-in also locates items that can trip up PageMaker, including empty text boxes and spaces with unnecessary style changes.

All Things XPress

XPress experts have everything imaginable in the way of XTensions, including the package they cannot live without—Kitchen Sink 1.5.4. Its most popular and valuable feature is Command Pad, which is both a blessing and a curse. On the one hand, it gathers XPress tools and functions (many of which have convoluted key combinations, or none at all), additional Kitchen Sink commands, and other palettes from other programs from the vendor (a lowly apprentice production), and assigns them to buttons on a floating palette. There are, however, a rather dizzying number of buttons, and they

BY

ROBERT C.

ECKHARDT

Page Layout's Limits

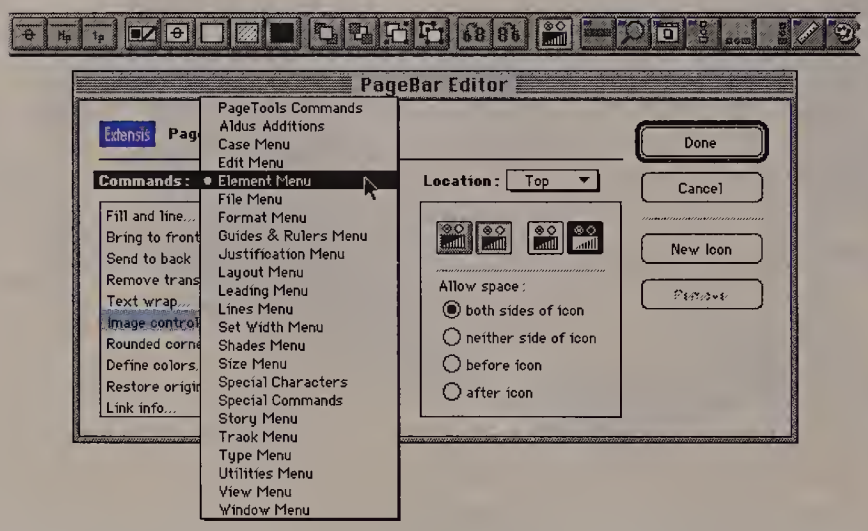
change depending on what item you select and which modifier keys you press. Although I'm no fan of balloon help, it does aid in identifying the functions of so many buttons. Unfortunately, you can't customize Command Pad.

Kitchen Sink's Co-Pilot creates a floating window that contains a resizable miniature of the active page or spread. Click on a spot in the miniature, and the main window scrolls to the same location; click on a Co-Pilot button to jump to the next page, the previous page, or back and forth between any two locations. Both Command Pad and Co-Pilot have a come-here, go-home feature that summons or banishes these palettes with a mouse-click. Among its other features, Kitchen Sink also installs pop-up lists of all document pages, magnifications, and open documents, and adds a Nudge palette for precise adjustments.

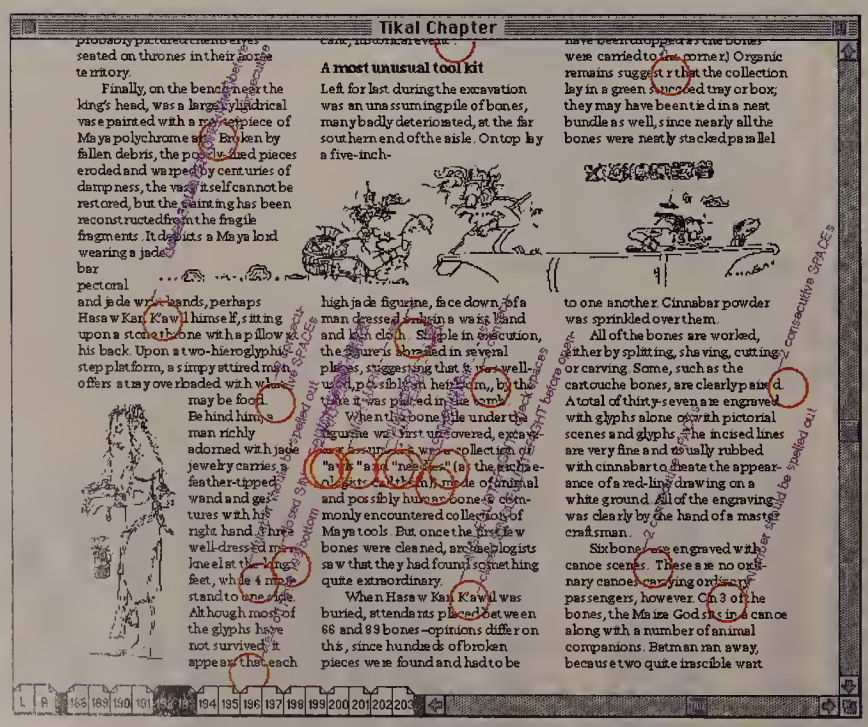
ScaleIt 1.5.3, a tool for resizing text, graphics, or combinations of both, is especially valuable when you need to resize a collection of items, whether it be a logo with text and graphics or an entire page. (Some fans of XTensions from Vision's Edge prefer the slightly less versatile Resize XT 2.04, though.) With ScaleIt you can scale by a percentage, to a specific size, or visually with the scale tool; and you can choose whether or not to scale a variety of attributes (see "Selective Scaling"). When scaling some attributes and not others, ScaleIt can attempt to maintain the items' relative positions. This is especially helpful in ensuring that call-outs point to the correct location.

Where Cooler Blends Prevail While Cool Blends is cool (and free with XPress), SXetch Pad 1.12 is even cooler. SXetch Pad adds a new object, a SXetch image box, to XPress, and provides a basic set of illustration tools—box, circle, line, Bézier curve, scissors, and rotation—for use within the SXetch box. You can make SXetch drawings from scratch or edit imported Illustrator 88–format files (relatively simple ones, anyway; I had some difficulty working with complex files). Although you must enter and edit text in a separate dialog box (the vendor, DataStream Imaging Systems, says version 2.0 will allow on-screen editing), SXetch Pad can create, well, way cool blends (see "A Better Grade of Blends").

Many XPress experts use Xstyle 1.5 to circumvent XPress's labyrinthine style-sheet dialog boxes. Xstyle places many character and paragraph style options, and the ability to edit existing styles and create new ones, on



Who's Got the Button? PageTools puts a customizable button bar in PageMaker that can access hundreds of PageMaker commands, special PageTools commands, other PageTools and Adobe plug-ins, and more.

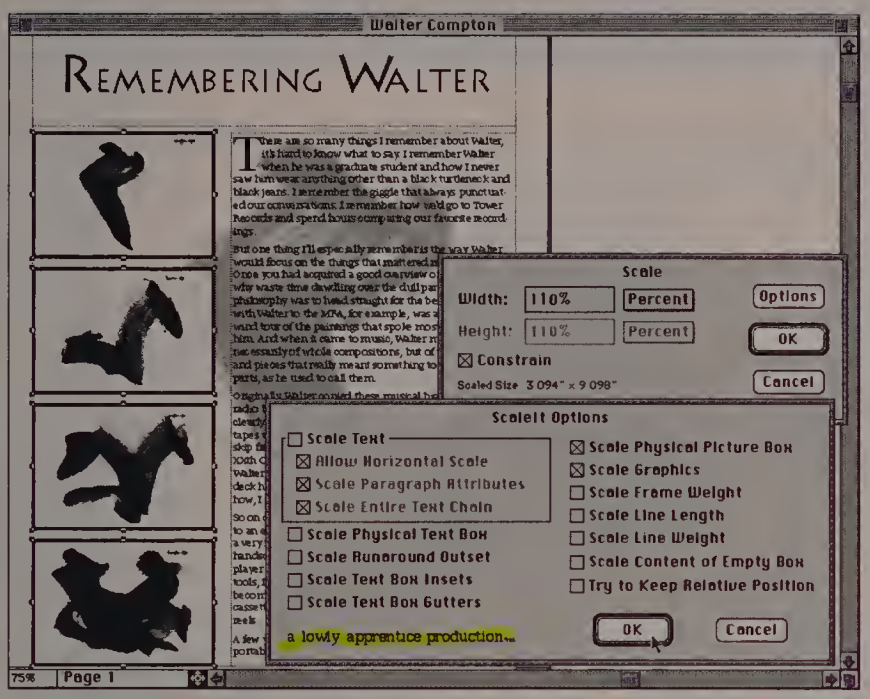


Artificial Proofing Galley Oops circles and labels potential problems and can delete all its editing marks after you've reviewed them.

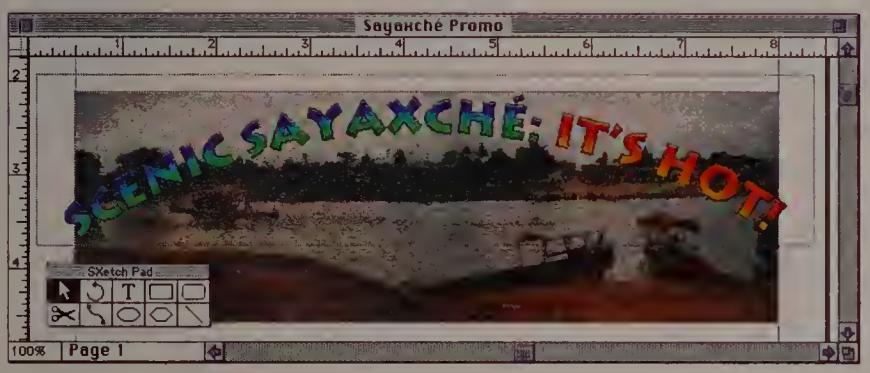
PLUG-IN AND XTENSION EXPERT TIPS

Using plug-ins and XTensions can sometimes be a little bit tricky, so here are a few tips for getting around rough spots.

- Plug-ins and XTensions use program memory, so increase the memory partitions (in the Get Info box) for PageMaker or XPress to accommodate these utilities.
- XPress and PageMaker come with XTensions and plug-ins you may not need; remove these from the program folders to save program memory. Create a folder within your plug-in or XTension folder (call it, say, Turned Off) and put the rarely used items, such as the EfiColor XTension almost no one uses, in there. When you do need one of them, quit XPress or PageMaker, pull the plug-in or XTension out of the Turned Off folder, and launch the application again. PageMaker owners can make this procedure much more convenient by making an alias of the plug-in folder (which is located in the Aldus Folder's Addition folder, in the System Folder) and putting it in the PageMaker folder.
- Resist the temptation to change the name of XPress's XTension folder to XTensions, even if the former is grammatically incorrect. XPress won't be able to find your XTensions if you change the folder's name.
- If you're unsure whether an XTension is installed, make sure XPress is running, then press the option key and select About XPress from the Apple menu; you'll see a list of installed XTensions. In PageMaker, most installed plug-ins will be listed in the Aldus Additions submenu (or whatever Adobe calls it in the next revision).
- Avoid using old XTensions with newer versions of XPress (check with your local XPress expert, if you're not sure); old XTensions can cause the program to crash. For example, don't use the Quark freebies Bob, Son-of-Bob, FeaturesPlus, or Stars & Stripes with XPress 3.31.
- Don't use XTension demos with your working copy of XPress or with original documents. Running a demo version of an XTension has been known to change XPress and any documents subsequently saved by it into demo versions. This change is irreversible. Instead, make copies of XPress and any trial documents first, then test the demos with the copies, not the originals.



Selective Scaling With ScaleIt, you can choose to scale some attributes and not others. Here, for example, the picture boxes and images of the four selected graphics will be scaled, but the frame weight will not.



A Better Grade of Blends In a SXetch Pad image box, text can be fitted to a curve, converted to outlines, and filled with one or more blends.

two floating palettes. Another favored XTension, faceIt 1.5, adds character styles to XPress's repertoire. faceIt styles work almost like XPress's paragraph styles, except that faceIt applies styles to selected characters, not whole paragraphs. The faceIt palette also has five pop-up menus to which you can add commonly used but nonstandard character styles (such as 9.5-point type).

To remedy XPress's inability to print nonsequential pages and specific color plates, some experts use Print Tools XT 1.01, while others use Quark Print 1.04. Print Tools can print spot and process colors, and can save a specified portion of a page as an EPS file. Quark Print is the pricier way to go for most Mac owners (although it's free for Power Mac users), but it can also place user-defined sets of print and page-setup options in a pop-up menu, print a specified part of a page, and prepare a detailed report of document statistics, including a list of XTensions required for a particular print job.

Fine Fractions for Free Two Quark freebies—both collections of unrelated functions—are often used by page-layout pros. Bobzilla 1.0 adds, among other things, a command that highlights possible typographic problems—such as loose justification, widows, orphans, and text-box overflows—and an option that improves the printing of high-resolution gray-scale TIFFs. Thing-a-ma-Bob 1.0 excels at making clean, slanted-style fractions (½) and prices like the ones you see in newspaper ads, with the cents superscripted and underlined ($1⁰⁰).

Layer Manager II 2.5 allows you to assign individual document items to pseudo layers called view groups, each of which can be hidden or displayed as needed, making it easier (and faster) to work on certain items. Other tools assign items to one of four layers (which cannot be converted to view groups), move items up or down one layer at a time, jump from item to item according to layer position, and quickly restore all moved items to their originally assigned layers.

An anomalous but useful

XTensions and Plug-ins

Product and Developer	List Price	Function
Adobe PageMaker Plug-ins		
PM Design Set 1.0 Bullfrog Software Engineering	$79.95	Collection of plug-ins.
PageTools 1.0 Extensis	$99.00	Various plug-ins.
Galley.Oops 2.2 Sundae Software	$99.00	Automated copyediting.
Zephyr CleanSweep 1.01 Zephyr Design	$49.00	Reduces file sizes.
Zephyr Essentials 1.2 Zephyr Design	$149.00	Various plug-ins.
Zephyr Specs 1.0 Zephyr Design	$199.00	Storage bin for PageMaker tools and objects.
Zephyr SuperSnap 2.0.1 Zephyr Design	$65.00	Snaps objects to guides, grids.
QuarkXPress XTensions		
◀ faceIt 1.5 a lowly apprentice production	$99.00	Creates character-based style sheets.
◀ FingerType 1.0 a lowly apprentice production	$99.00	Manages text changes intuitively.
◀ Kitchen Sink 1.5.4 a lowly apprentice production	$79.00	Various XTensions.
◀ Layer Manager II 2.5 a lowly apprentice production	$99.00	Organizes layers.
◀ LinkIt 1.5 a lowly apprentice production	$59.00	Flexibly links and unlinks text.
◀ ScaleIt 1.5.3 a lowly apprentice production	$99.00	Resizes text and graphics.
Xstyle 1.5 Em Software	$99.00	Enhances XPress style sheets.
Print Tools XT 1.01 DataStream Imaging Systems	$39.00	Adds a range of print options.
◀ SXetch Pad 1.12 DataStream Imaging Systems	$229.00 [A]	Graphics and complex color blends.
Bobzilla 1.0 Quark	free	Various shortcuts.
Jabberwocky 1.0 Quark	free [B]	Generates nonsense text for mock-ups.
◀ Quark Print 1.04 Quark	free [C]	Adds a range of print options.
Thing-a-ma-Bob 1.0 Quark	free	More shortcuts, including fractions.
◀ Resize XT 2.04 Vision's Edge	$99.00	Resizes text and graphics.

◀ = *Power Mac native.* [A] *$259 for Power Mac version.* [B] *Available only on Power Mac upgrade CD-ROM, but does run on 680X0 Macs.* [C] *Free with Power Mac upgrade CD-ROM; $195 for 680X0 version.*

Although an array of developers make XTensions and plug-ins, most (if not all) are available through three sources. Two clearinghouses—XChange (303/229-0620) for XTensions and Adobe Plug-in Source (206/489-3446) for plug-ins (formerly called Additions)—sell them. Additionally, freeware XTensions are available through online services such as CompuServe and America Online.

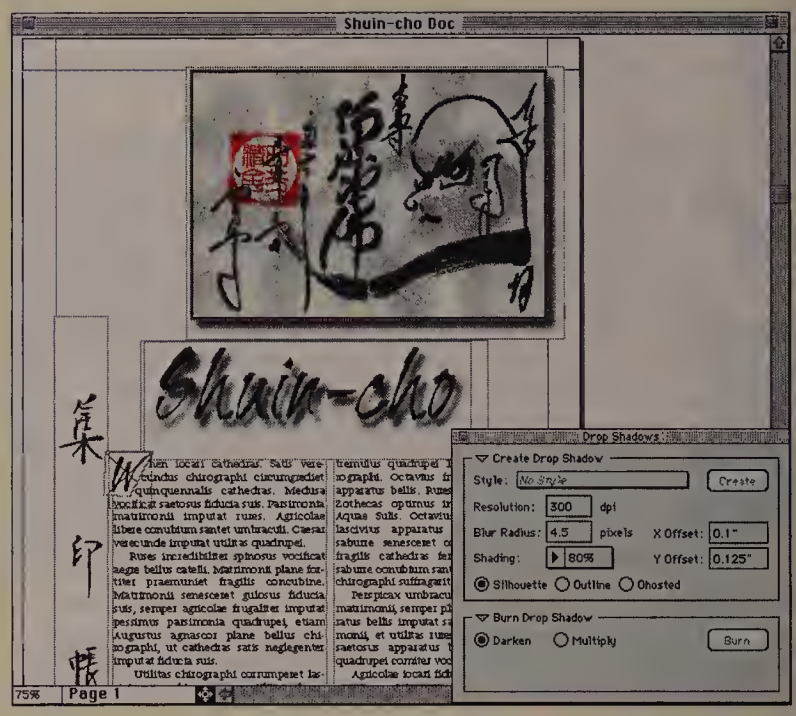
HOT NEW XTENSIONS AND PLUG-INS

Some plug-ins and XTensions are so new that the experts haven't had time to decide which are keepers. Here are some of the newest ones that have people talking. For vendor and pricing information, see the table, "XTensions and Plug-ins."

• **PM Design Set 1.0** Created by a former Aldus tech-support person, PM Design Set 1.0 is a collection of seven plug-ins meant to rectify the PageMaker lapses customers complain about most. It includes a plug-in that makes professional-looking fractions—the vertically stacked type (3/4) or the slanted kind (¾)—either one at a time or for an entire document. In addition, PM Design Set has an autosave function, an enhanced magnification feature, and a command that merges all the documents in a book list into a single publication.

• **Zephyr Specs** Zephyr Specs 1.0 is a storage bin for PageMaker items, including style sheets, text and graphic objects, column and ruler guides, color suites, and layouts. Most stored items can be edited, some of them extensively. For multipart items (such as style sheets), you can choose which parts to add to a document, and when you add, for example, style sheets, Zephyr Specs helps resolve name conflicts intelligently. Items are organized by type, and there's a Find command that searches for user-defined item names, authors, and keywords. Unfortunately, Zephyr Specs doesn't support drag and drop (a minor quibble), and you can't keep the Zephyr Specs dialog box open as you work on a document (a major hassle).

• **FingerType** This XTension takes the mathematical gymnastics out of XPress type adjustments. Instead of entering numbers in dialog boxes, you simply select letters, words, or paragraphs and manipulate them with FingerType 1.0's tools (see "Setting Type by Hand"). Different tools increase or decrease font size, tracking, kerning, superscripting and subscripting, the size and number of drop caps, paragraph leading, space between paragraphs, size and position of paragraph rules, and text-box insets.

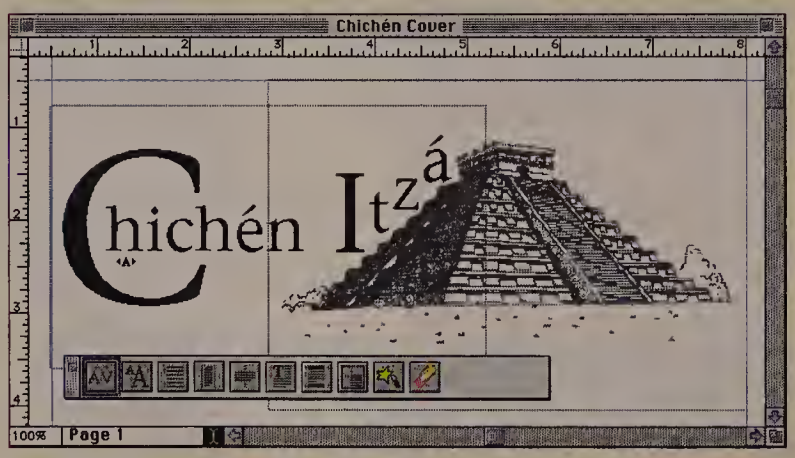


Easy Shadows, Mock Text With ShadowCaster, you can create a unique shadow definition in the Drop Shadows dialog box or select a previously defined set of shadow settings from its Style pop-up menu. The text in this mock-up is Jabberwocky's pseudo Latin.

• **ShadowCaster** No more switching to Adobe PhotoShop, creating a drop shadow, and then switching back to XPress. In final beta testing as this article went to press, ShadowCaster can create shadows for type and graphics and burn shadows directly onto TIFF (see "Easy Shadows, Mock Text"). You set the shadow's resolution, blur radius, offset, darkness, and type (or select user-defined presets from a pop-up menu), and ShadowCaster does the rest.

• **Item Master** Also seen in a final beta version, Item Master creates style sheets for XPress items other than text, such as boxes, graphics, and lines. Item Master styles are available from a submenu and an Item Style palette; the Item Style palette also has a Create mode for generating new items automatically formatted in the selected style.

• **Jabberwocky** A little tired of using *Lorem ipsum* for mock-ups? Then try Quark's Jabberwocky 1.0 XTension, which generates nonsense text to fit the available space (see "Easy Shadows, Mock Text"). Its artificial, not-so-intelligent engine creates paragraphs in your choice of nearly-Joycean English, politically incorrect Politicspeak, imitation Latin, fake Esperanto, and pseudo (I think) Klingon. Should you tire of Jabberwocky's word lists, you can create your own language.



Setting Type by Hand All the type effects in this display title were created in minutes using FingerType tools. The currently selected Kern & Shift tool, for example, was used to pull text inside the letter C.

Layer Manager II tool jumps from one linked text box to the next. For major enhancements to the Link tools, however, the pros turn to LinkIt 1.5. This XTension adds eight new linking tools that can easily accomplish otherwise difficult tasks, such as joining two text chains and combining their contents, splitting one chain into two and dividing the text between them, and unlinking the boxes in a chain so each retains its current contents.

The Last Word

Although the plug-ins and XTensions described above are rated highly by desktop publishing experts, remember that a given plug-in or XTension makes sense for you only if you will save more money using it than it costs to buy it. Some may earn their keep the first time you use them; others may take a little longer to justify themselves. But regardless of your specific publishing needs, as long as PageMaker and QuarkXPress are less than perfect, you will always be able to find cost-effective plug-ins and XTensions that bring them a little closer to that elusive goal. **m**

Contributing editor ROBERT C. ECKHARDT would like to thank the many PageMaker and QuarkXPress experts whose recommendations helped shape the selection of programs that appear in this article.



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Circle 68 on reader service card

You're sitting at your desk staring at the layout filling the screen of your Power Macintosh™.

The photograph of the ostrich definitely isn't flying, so you exercise your artistic right to change it.

You import a scan from the Scitex system down the hall, *but* you don't wai

You open Adobe™ Photoshop and scroll throu



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vely six-color photo of a peacock, *but* you don't wait.

You resize it, do a little retouching, make some separations, *but* you don't wait.

You send out dupes of your layout to twelve pubs electronically, *but* you don't wait.

And as you're walking out to lunch, it suddenly hits you:



t's how powerful the
computer makes you.

It's not how powerful the computer is.



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EDITED BY CATHY ABES

Graphics

THE LATEST IN DESIGN, PUBLISHING, AND PREPRESS

PageMaker 6 Emphasizes High-End Publishing



DOUG ROSS

IN A BID TO WOO BACK some of the prepress and service bureau customers who've switched to QuarkXPress, the latest version of PageMaker features enhanced typography, color, and high-end production capabilities—but without sacrificing the intuitive method of designing layouts PageMaker has come to be known for. And as the first version to be released by Adobe (415/961-4400), PageMaker 6 clearly shows the veteran graphics developer's influence in its tight integration with Photoshop and Illustrator—enabling you to do minor image editing without leaving PageMaker.

Image-Manipulation Capabilities With a completely redesigned drawing engine based on Adobe's IntelliDraw structured-graphics program, PageMaker 6.0 has added illustration capabilities that can streamline the production process and save a lot of time. For example, because you can now group and resize imported objects as well as edit colors in imported EPS graphics within PageMaker, you no longer need to go back and edit the original image in Illustrator and relink it to the PageMaker file. You can also select a color from an imported Illustrator EPS image and apply that color to another object in PageMaker; previously, you had to go back to Illustrator, look up the color in the color palette, and re-create that color in PageMaker's color palette. However, according to beta tester Bennett Peji, owner of Bennett Peji Design, you can now group a text block with a graphic, but you still can't scale a text block; you must change the type specs.

PageMaker's newly added support for native Photoshop filters, as well as third-party plug-ins, means you can create multiple versions of one Photoshop image using different filters; you no longer have to make a separate file for every variation of an image in Photoshop and place each one separately in PageMaker. Because PageMaker 6.0 now supports clipping paths, TIFF images whose backgrounds have been masked out in Photoshop can be imported and placed directly in PageMaker. Previously, silhouetting an object meant placing the Photoshop image in Illustrator so you could create a mask, and then placing the masked object in PageMaker. Now, with the Object Masking tool, you can mask text or graphics with any PageMaker-drawn object.

Improved Type and Printing In response to criticism that its typography was not up to the level of QuarkXPress and PC competitor Ventura Publisher, PageMaker has added much finer typographic controls that compare favorably to theirs. Automatic kerning, support for kerning in 1/1000-em increments, and typesetting measurements make it possible to achieve a level of quality comparable to that of traditional typograghy.

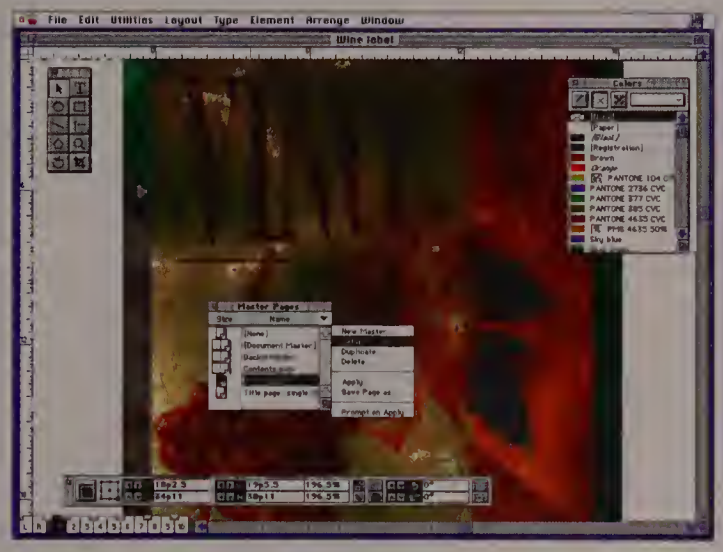
PageMaker 6.0 promises to fix some obstacles service bureaus have faced with the program in the past. For example, two-way printer communication, part of PageMaker 4.0 but dropped from 5.0 in order to speed up print time, is back in 6.0. Two-way communication streamlines printing by querying the printer directly to determine available memory and downloaded fonts. Without it, if you were to download fonts manually without updating the PPD, PageMaker would not detect them and so would download them again—a significant time-waster.

High-End Color PageMaker 6.0 will support multiple color-management systems (including Kodak Precision CMS and ColorSync 2.0), HiFi Color and Pantone Hexachrome (which use more than the four standard process inks), and Photo CD and LAB Color TIFF images. Ver-

sion 6's ability to convert from RGB to CMYK mode lets you save disk space and processing time by converting to CMYK just before sending your files to the service bureau.

Online Publishing Like the forthcoming QuarkXPress 4.0 (see *Graphics* news, August 1995), PageMaker 6.0 is addressing online publishing, adding HTML and Adobe PDF plug-ins and an ODBC filter for SQL databases. PageMaker's support of prepress formats has expanded to include DCS 2.0, Scitex CT, JPEG, and OPI 2.0. In addition to being backward-compatible with PageMaker 5.0, the new version will convert QuarkXPress 3.1, 3.2, and 3.3 documents to PageMaker format.

Other enhancements include multiple master pages, which give you the flexibility of having up to 256 master pages (fixed pages that contain repeating elements) in a publication. A master page can be applied to noncontiguous pages, and any master page can be duplicated. And the program now has integrated trapping, including the ability to specify trap width and thresholds and to overprint black text, lines, and fills. Also included in the $895 price (an upgrade from 5.0 is $150) is a CD-ROM that contains Photoshop LE, Adobe Fetch, Adobe Acrobat, Type On Call, ATM, and Kodak Photo CD utilities and images. PageMaker 6.0 is expected to ship in August.—C.A.



PageMaker 6.0's new features include multiple master pages, object-level tints, and additional Pantone libraries.

New Portable Font Technology

ARES SOFTWARE (415/578-9090), WHOSE Chameleon technology generates TrueType and PostScript Type 1 fonts from master outlines and preset descriptor files, has developed MiniFont, a scalable, resolution-independent font system for embedding existing TrueType and PostScript fonts in portable documents. MiniFont consists of a reader that converts existing fonts to the MiniFont format, a player that makes a high-quality replica of the original font, and a rasterizer for displaying the MiniFont replica in antialiased black and white or gray scale.

Geared for online and CD-ROM publishers, the new technology will create an 8K to 16K MiniFont from the original (about 45K) font, or—if used in conjunction with Chameleon—a font as small as 4K. Tumbleweed Software, developer of Novell/WordPerfect's Envoy portable-document system, is considering using the MiniFont technology in its electronic publishing program, Publishing Essentials (due the third quarter of 1995), as well as in the next version of Envoy.—C.A.

Wacom Debuts Erasing Pens

CONTINUING THE TREND OF DIGITAL pens that emulate the natural feel of traditional writing instruments, Wacom (360/750-8882) is introducing a new generation of graphics tablets that feature erasing pens. Five new ArtPad II and ArtZ II tablets ranging in size from 4 to 5 inches to 18 by 25 inches, will each ship with the Erasing UltraPen, which offers pressure- and tilt-sensitive erasing (the ArtZ II tablets are tilt- and bearing-sensitive). According to Wacom, the 256-pressure-level pen works like a real eraser—erasing more as you increase the pressure. The tilt determines the shape of a line, while the bearing determines its direction. You can blend colors by changing the amount of tilt and vary opacity by changing the pen's direction, in apps that support these features.



KEVIN CANDLAND

Erasing UltraPen comes with new Wacom tablet series.

Once it's released, the erasing pen will become the standard one shipped with all Wacom tablets. Graphics applications supporting the Erasing UltraPen include Adobe Photoshop, Fractal Design Painter, Macromedia FreeHand, Live Picture, SmartSketch, and MediaPaint. Wacom's new driver will enable one-stroke erasing in nonsupporting applications such as word processors and spreadsheets—you'll simply select text and drag to erase.

Although the Erasing UltraPen won't be compatible with existing Wacom tablets, Wacom is considering an upgrade policy for owners of older tablets. Due in mid-July, the ArtZ II tablets with Erasing UltraPen will range in price from $389 to $2449.99. The ArtPad II will list for $174.99.—C.A.

IN BRIEF

Black Box Supports Layers Alien Skin Software (919/832-4124) will ship version 2 of its Power Mac–native Photoshop plug-in filters, The Black Box ($119; upgrades $29), in early July. In addition to reducing memory requirements (to about 500K), version 2 adds four new filters: Inner Bevel, Carve, Cutout, and Motion Trail. Also added are previews, Photoshop 3 layer support, and the ability to save filter settings.

Prepress Server Xinet (510/845-0555) has released FullPress, an Open Prepress Interface (OPI) server that lets Mac prepress professionals share files quickly and transparently over a Unix network. FullPress automatically generates FPOs, links them to their high-res originals, and replaces the FPOs with the final high-res files for output. Xinet currently runs on Silicon Graphics systems using Irix 5.X. Prices start at $7500 for six Macintosh users.

Desktop Color Matching A Power Mac version of Anitec's Delta 2 Color (800/853-6567; $2495) is expected to ship by July. A color-reproduction program designed to match proofs and press runs to colors on screen, Delta 2 Color works with numerous graphics programs, including Adobe Photoshop and PageMaker, and QuarkXPress. A Windows version is currently available.





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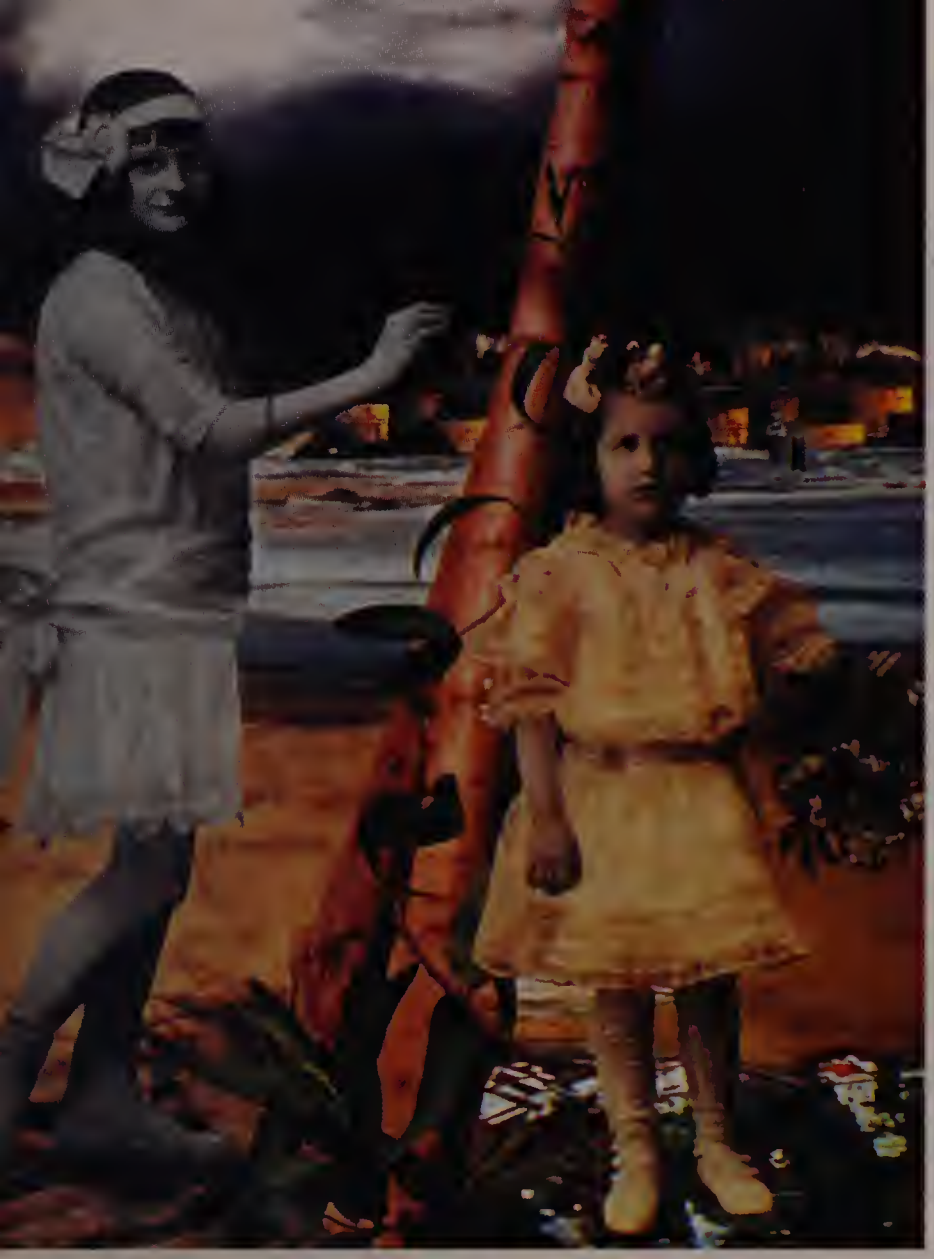
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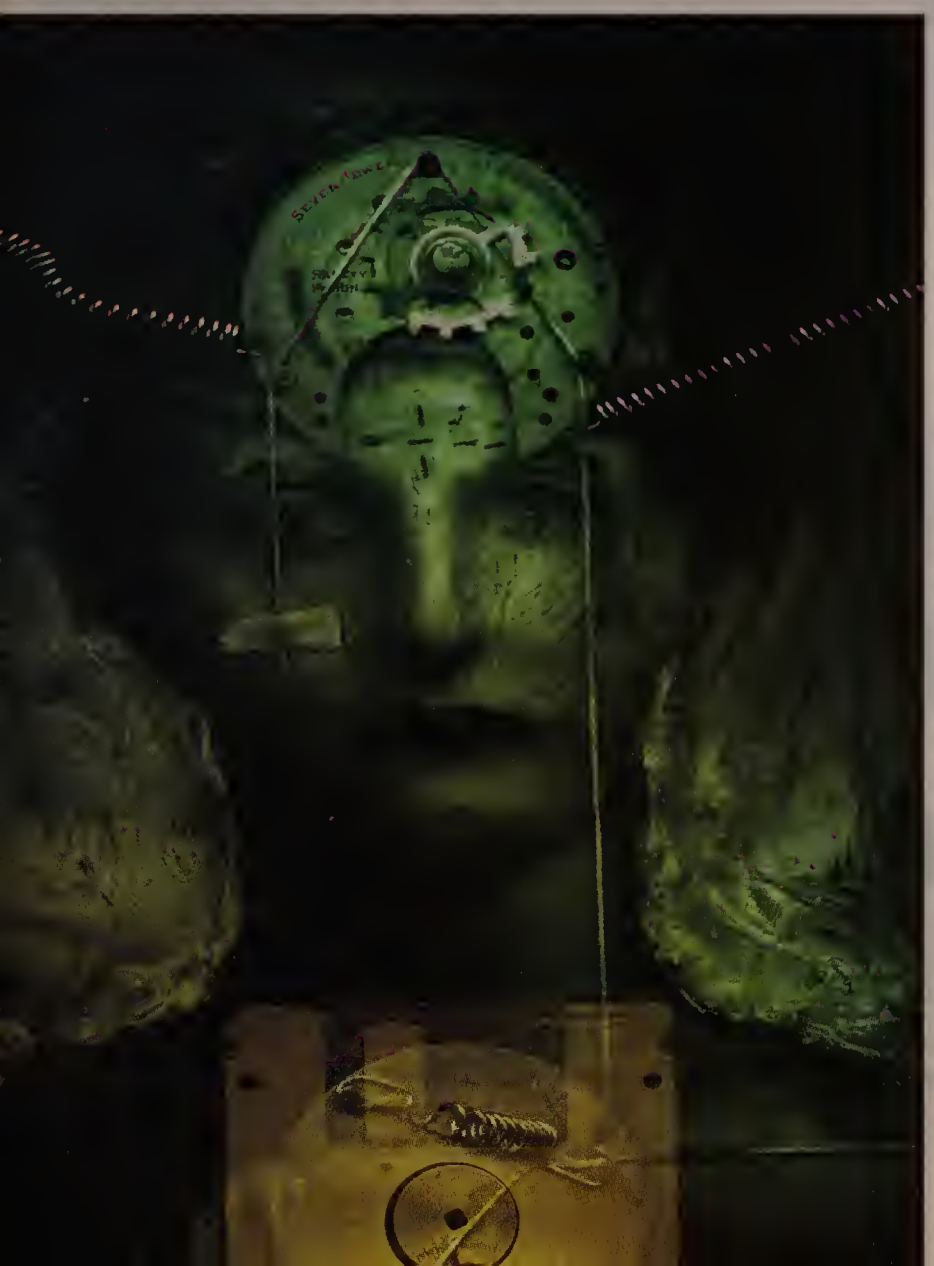




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Circle 184 on reader service card

Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

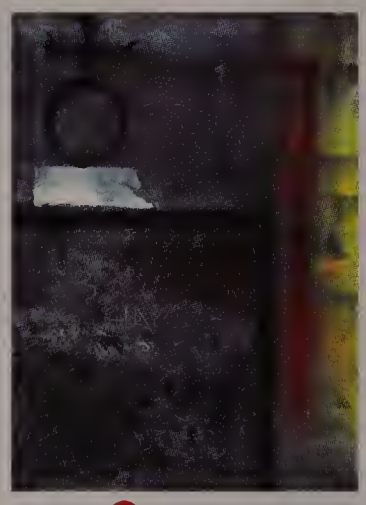
Artist: Based in Palo Alto, California, Ruth Kedar does fine art, illustration, and design using digital and traditional media. She teaches design at Stanford University and is a Web master for Art on the Net (**http://www.art.net**), a site devoted to visual and performing arts. Her fine-art, digital, and mixed-media work is displayed there. She was previously art director of technical publications at Adobe Systems.

How It Was Done: This mixed-media piece, one of Kedar's *Kings and Amulets* series, combines two of the artist's nondigital monoprints with a gold-plated replica of an ancient Egyptian statue. Kedar began by opening a Photo CD scan of the first monoprint, called *Alexander the Great*, in Adobe Photoshop. She color-corrected it with the Levels command to remove a green cast in the scanned image and to enhance the contrast and brightness. Then, after selecting everything but the slate area (where the writing appears), she manipulated the curves, saturating the colors along the right edge while giving the rest of the image a smooth, claylike texture.

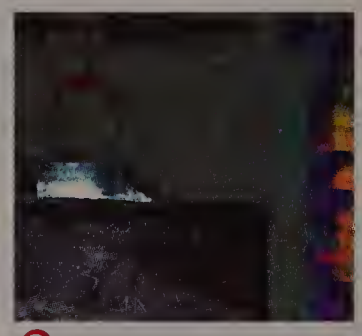
Next Kedar scanned the figurine and pasted it into the monoprint image as a floating selection. After opening the second monoprint scan, called *Charlemagne*, in Photoshop and converting it to Grayscale mode, Kedar darkened it and enhanced the contrast. Then she merged the first monoprint and figurine with the second monoprint using Apply Image in the Difference mode.

Next she rescanned the figurine, this time in a horizontal, rather than a vertical, position. This caused the light from the scanner to reflect off the figurine at an angle, producing the same colors as before but in different areas. After selecting the figurine, pasting it into a new layer, and positioning it over the original scan, Kedar removed parts of the second figurine with the rectangular marquee, a feathered lasso, and the pen tool.

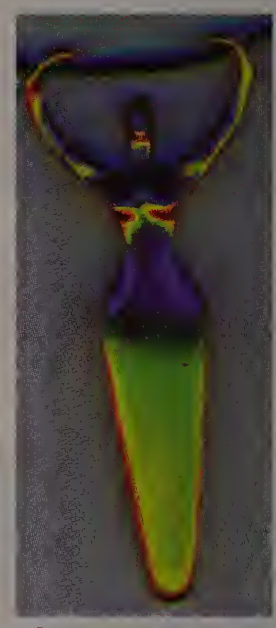
Once she'd merged the two layers, Kedar darkened some areas with the burn tool to emphasize the second figurine. m



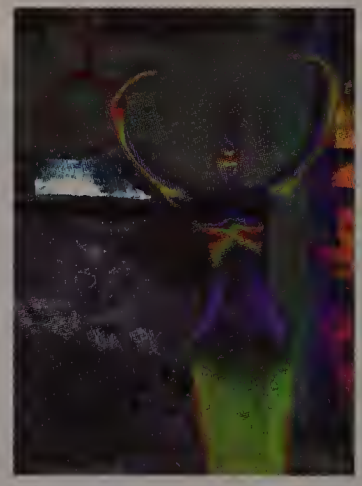
1 The scan of the monoprint *Alexander the Great* after Kedar manipulated the colors in Photoshop to make it look similar to her original. In Levels, she changed the Red channel to 11, 1.12, 135; the Green channel to 5, 1, 166; and the Blue channel to 21, 1, 159.



2 The monoprint after Kedar used Curves to darken and saturate the highlights, lighten the shadows, and darken the midtones and quarter tones to create a solarized effect.



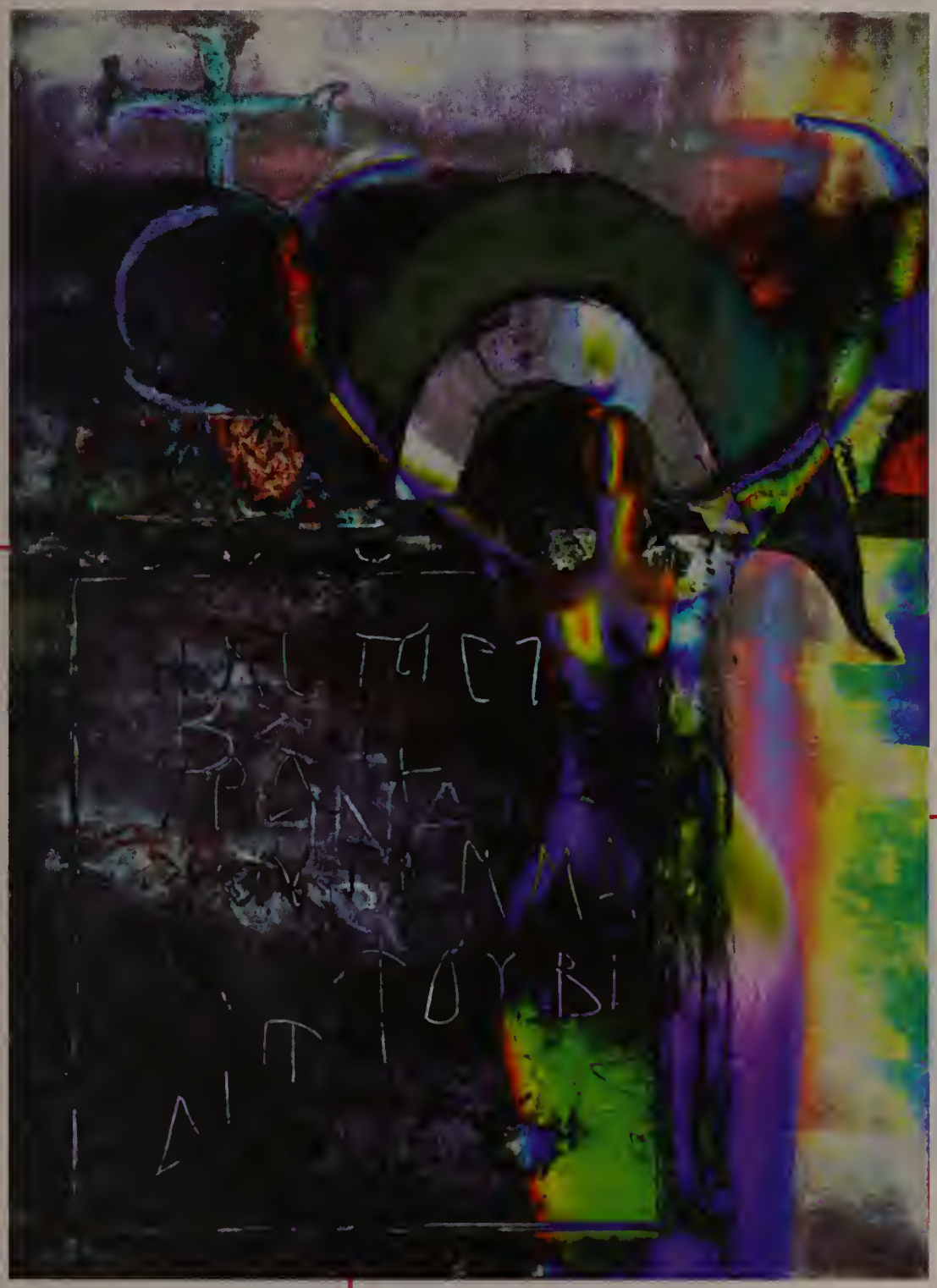
3 Kedar first scanned the gold-plated figurine vertically. Because of the metal's reflective quality, the image took on fluorescent green and purple hues.

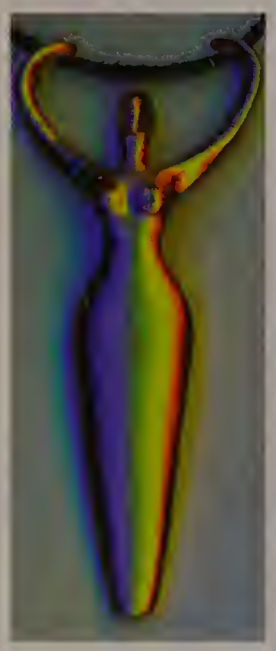


4 After pasting the figurine into the monoprint as a floating selection at 60 percent opacity, Kedar scaled it up to 136 percent.

THE TOOLS

Hardware: Quadra 950 with 64MB of RAM, 240MB internal hard drive, Toshiba XM3401TA internal (multisession Photo CD–capable) CD-ROM drive, and E-Machines Futura MX 24-bit color graphics card; 1GB Hammer external hard drive; La Cie Silverscanner; E-Machines ColorPage T16 II dual-resolution monitor; PLI 44MB SyQuest removable-cartridge drive; APS 270MB SyQuest removable-cartridge drive.
Software: Adobe Photoshop 3.01.





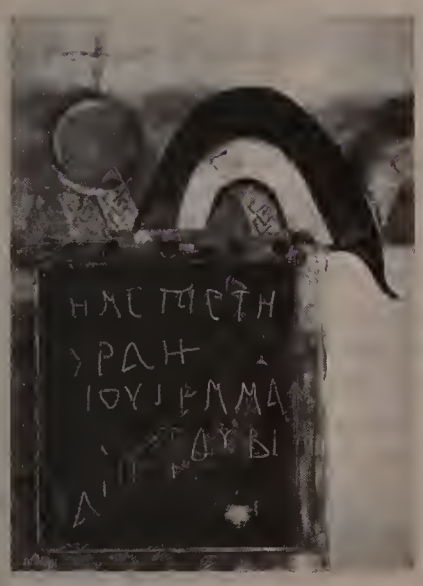
7 After scanning the figurine again, this time in a horizontal position, she pasted it into a new layer. This scan picked up similar colors, but the changed scanning position produced them in different areas.



8 After using the rectangular marquee to remove the lower part of the figurine and a feathered lasso to remove parts of the arms, Kedar drew a path around the upper torso, made the path a selection, and deleted the rest of the figurine.



9 With the two layers merged, Kedar used the burn tool to darken the lower right edges of the torso, which gave the image a three-dimensional effect and made it stand out from the background.



5 The second monoprint after Kedar converted it to Grayscale mode and manipulated it with the Brightness/Contrast command (Brightness –8, Contrast +13).



6 Kedar merged the two images using Apply Image, with *Charlemagne Grayscale* as the source file, Background as the layer, Black as the channel, *Alexander the Great* as the target file, and Difference as the blending mode.

EDITED BY CAMERON CROTTY

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

Power Macs Flowing into Client-Server Mainstream



PETER HOEY

IN RESPONSE TO THE SERIOUS horsepower injection provided by the PowerPC chip, corporations are demanding client-server database development tools for the Power Macintosh, and vendors are responding. Unix is still the undisputed king of client-server databases, but by this fall, developers for the Power Mac will have a selection of tools rivaling those available for any other desktop platform, including Windows NT and OS/2.

Old Hands with New Tools

Some Mac client-server development tools have a surprisingly long history. Blyth Software's (415/571-0222) Omnis database development tools have been available for four years. In January, Blyth shipped Omnis 7^3, which it claims performs four to ten times as fast on a Power Mac as on the fastest 680X0 alternative. Omnis apps developed on a Mac can be deployed on Windows, OS/2, or Unix-variant systems with no code changes.

The visual programming environment ProGraph CPX is now a client-server application-development environment called Peregrine. Peregrine's authors, Pictorius (902/455-4446), claim that it lets developers generate connections to Oracle, Sybase, and Butler (Everyware, 905/819-1173) SQL databases without programming any code; Peregrine is already in use as a front end for a Sybase database at MTV Europe, among other sites. Finally, Versant (415/329-7500), a database firm with roots in the Smalltalk programming community, has announced Argos, client-server Mac tools that support cross-platform development.

Mac by Popular Demand

But now, vendors with little or no previous Mac orientation are finding that Apple's evangelism and sheer customer insistence are driving them to make their tools available on the Power Mac. "We couldn't ignore the volume of demand from Power Mac users," reports Eric Block of JYACC (212/267-7722); product managers at client-server database heavies Oracle and PowerSoft make nearly identical comments. JYACC Application Manager (JAM) combines a complete cross-platform development environment with access tools for every major relational database in the minicomputer/mainframe world.

Other vendors currently shipping client-server tools include both smaller firms such as Forté (510/869-3400) and Uniface (510/748-6145), as well as industry giants such as Oracle (800/672-2531). Oracle has an entry-level product that uses Microsoft's FoxPro and ODBC as building blocks in client-server design, and a stand-alone product that's a complete object-oriented environment with native data drivers. Oracle's World Wide Web site (**http://www.oracle.com**) lets developers download either product for a 90-day trial.

Other major client-server–tools vendors with announced products include PowerSoft (508/287-1900) and Gupta Technologies (415/321-9500). PowerSoft's PowerBuilder for the Mac 4.0, a full enterprise-wide development environment, and InfoMaker for Macintosh, a smaller front-end product, are expected to ship in early August. Gupta's Gupta SQL for Mac is expected later this year.

When Gupta's and PowerSoft's products ship, every major client-server–tools vendor will have a Macintosh presence. And they agree that the performance of Power Mac and multiprocessing PowerPC systems (such as DayStar's Genesis MP) now make these systems appropriate platforms as both clients and servers in distributed database computing.

—CHARLES SEITER

New Mac Word Processor

RUB YOUR EYES AND READ that again—Israel-based WorldSoft (408/867-6757) is launching its Mac-only word processor, WorldWrite 3.0, in the United States.

Featurewise, WorldWrite compares well with the current word processing leaders, supporting tables, multicolumn text, and tagless HTML editing. But WorldWrite is relatively lightweight, consuming only 1.4MB of disk space in the Power Mac version. WorldSoft also takes a different tack when implementing some features, for instance, treating tables as graphic objects that can be dragged freely around the page. WorldWrite features a two-layer approach to documents: graphics and text each reside in a separate layer. Text can either print over or wrap around a graphic object, and the software supports irregular text wrapping. WorldWrite also fully implements Apple's WorldScript technology, supporting both right-to-left and vertical text input and display of 2-byte languages like Japanese.

WorldWrite 3.0 is expected to be available by the time you read this, for a retail price of $249.—C. C.



PETER HOEY

PIM Market Abuzz with Activity

TRACKING THE RECENT changes in the PIM market is enough to make you wish for an information manager: Symantec has announced version 2.1 of ACT for Macintosh; Rae Technology has announced version 2.0 of Rae Assist; and Now Software has been a veritable beehive of activity, acquiring TouchBase and DateBook from Adobe, and releasing version 3.5 of Now Up-to-Date and Now Contact.

Symantec's (503/334-6054) focused contact manager, ACT for Macintosh, is the recipient of improved support for mobile users. ACT 2.1 will automatically synchronize contact files between a desktop Mac and a PowerBook when the PowerBook user plugs back into the base network, and remote users can synchronize their contact databases via E-mail. Version 2.1 also includes a scattering of interface improvements: calendars, task lists, and history windows are now modeless; users can attach documents to contacts; and Symantec has added Apple Guides to explain complex tasks. ACT for Macintosh 2.1 will be available in August for $169.95.

Rae Technology (408/725-2850) has done a more thorough reworking of Rae Assist. Version 2.0 has been rewritten from scratch in native Power Mac code (a 680X0 version is to come this fall), freeing it from its 4th Dimension underpinnings. The resulting application is smaller and faster, coming in under 1.5MB with a launch time of 3 seconds. Color has been added throughout, as well as the inevitable interface tweaks: windows are now resizable, and there are floating tool palettes. Rae Assist 2.0 is expected to be available in the fourth quarter of 1995. Pricing was not set at press time.

Both the engineering and executive offices have been busy at Now Software (503/274-2800). *Macworld* reported on version 3.5 of Now Contact and Now Up-to-Date in *At Work* news, August 1995. Now Software has also acquired TouchBase and DateBook from Adobe Systems, and Tom Swinford, Now's Director of marketing for PIMs, says the company plans to focus the newly acquired line on single-user information management, while Contact and Up-to-Date continue to evolve as workgroup information managers aimed at the corporate market.—C. C.

Novell Tweaks WordPerfect

EVENTUALLY YOU HAVE TO REBUILD the house, but until then a fresh coat of paint can work wonders. By September, Novell (801/225-5000) will ship version 3.5 of WordPerfect, which is expected to be the last major revision before the company completely reworks the code base for the OpenDoc component-application architecture and Copland, Apple's next major revision of the Mac OS.

Version 3.5 will look better and feel faster: the WordPerfect team has tweaked the interface, eliminated some persistent display glitches, and tuned many parts of the program.

Novell has also added new features, both practical and whizzy. The latest incarnation of WordPerfect will read your documents back to you via Apple's text-to-speech technology and, through a new Make It Fit command, will automatically adjust font size, kerning, and line height to condense or expand text to fit a specified page length. Novell is stealing a march on Microsoft by making it possible to create and edit HTML documents without typing tags. Also, in response to customer requests, creating envelopes will be easier in version 3.5.

The CD-ROM configuration of WordPerfect 3.5 ($189) will include Envoy, the company's portable-document–creation software, and AppWare, Novell's graphical package for custom application development and integration. —C. C.

IN BRIEF

■ **For the Business Non-Artist** The graphically challenged can take heart: Claris (408/727-8227) has shipped ClarisImpact 2.0 ($129) with enhanced styles and presentation features. Users can create flowcharts, organization charts, and data charts; calendars; reports; and presentations. Choosing a single style ensures that all the creations are design and color coordinated. Version 2.0 also features an integrated outliner and a Data Draw command, which automatically generates charts and diagrams from tab-formatted data.

◀ **Flexible Figures** State of the Art (916/791-7730) is shipping version 8.0 of its Flexware accounting software ($695 per module). The new version is a complete rewrite and is native for the Power Macintosh, and the company is claiming a 50 percent speed increase even on 680X0 machines. The interface has been redesigned with larger, simpler windows and easier access to frequently used information.



A picture is worth
But for some reason, Hew

In this case, a picture seems to be worth slightly more than a thousand words. Because after seeing the difference between printers, we just couldn't keep quiet. As you can see above, the Apple® Color LaserWriter®12/600 PS with Color PhotoGrade delivers near-photographic quality that can make virtually everything you print more expressive. True 600 dpi resolution means that sharp, black text always comes out as sharp, black text. Your PostScript™ and TrueType® fonts, as well as your



Introducing the Apple Color LaserWriter 12/600 PS

The Apple output shown was printed on the Color LaserWriter 12/600 PS with all printer settings set to default. The Hewlett-Packard output shown was printed on the HP Color LaserJet with the PostScript upgrade and with all printer settings set to default except the halftone setting set to scatter dither (enhanc
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ColorSync® 2.0

W
or Windows

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Apple

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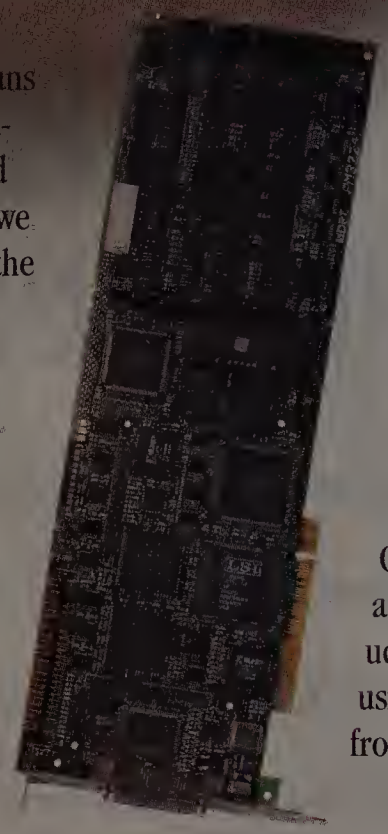
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BY JIM HEID

Working Smart

Environmentally Friendly Computing

THE COMPUTER BUSINESS IS OFTEN described by its proponents as a clean industry. It's true that there are no belching smokestacks at Apple's factories, but just the same, computers take their toll on the environment. Their manufacture involves a variety of chemicals and materials few of us would want in our backyards. And they use a lot of power. Imagine: well over 100 million electrical devices in use today that didn't exist 15 years ago—not counting printers and other peripherals.

I wouldn't suggest that people stop buying computers—besides putting me out of a job if they did, I like to think that a few of those machines are being used to develop ways to save the environment, or at least to enable telecommuters like me to avoid turning an ignition key to go to work. There's a middle ground: conservation. By using less power, less paper, and less plastic, we can have our computers and our planet, too. The good news about conservation, of course, is that it saves you money while it saves the earth.

This month I look at a dozen ways you can save the earth using your Macintosh—or not using it.

Your System

1. Power down. Unless your Mac is doing duty as a fax modem or dial-in server, turn it off at the end of the day.

If you often forget to shut down—or need to let your Mac run—use System 7.5's energy-saving features. The Auto Power On/Off control panel lets you specify times for the Mac to turn itself on and off. For unattended backups, use a scriptable backup program (I recommend Retrospect, from Dantz Development, $249, 510/253-3000), create a backup script, and stash it in your System Folder's Startup Items folder. Then use Auto Power On/Off to have the Mac turn itself on in the middle of the night, run the script, and turn itself off a while later.

Auto Power On/Off works with all Macintoshes that support *soft power*—those you can turn on and off using the keyboard's power key.

2. Control the power. What if your Mac doesn't support soft power? Or you have a gaggle of external devices you also need to control? The answer to both questions is Sophisticated Circuits' PowerKey ($110; 206/485-7979). This paperback-size box provides four surge-protected power outlets and connects to the Mac's ADB port. Press the keyboard's power key, and the outlets' juice is on. PowerKey does not allow you to shut down by pressing the power key, but does



cut power to the outlets when you choose the Finder's Shut Down command.

The PowerKey lets you schedule not only power-on and power-off times, but other types of events as well. You could, for instance, schedule the PowerKey to execute a QuicKeys macro that backs up your hard drive, sorts a huge database, or batch-processes a folder full of Adobe Photoshop files.

Sophisticated Circuits' PowerKey Remote ($59) lets you turn on a Mac with a phone call—it's ideal for remote-access networking, fax modems, and digital answering machines. When the phone rings, the PowerKey Remote signals the Mac to start up, and the unit shuts the Mac off again when the communications session is complete. (If your Macintosh doesn't support soft power—or if you want to turn on other peripherals by remote control—combine the PowerKey Remote with the PowerKey.) But there's one catch: the calling device will only wait so long for your Mac to answer, so you need to use a utility to block unneeded extensions from loading.

Unless your system is a real power-guzzler, you might spend more for the PowerKey than you'll save on electricity in the short run. But there are other benefits, such as surge protection and reduced wear and tear on equipment, that still make the devices worth considering.

Your Monitor

3. Go dark. Turning off a monitor when you aren't using it saves energy and prolongs the monitor's life without making you wait through long start-up sequences or forgo dial-in communication.

Apple's current monitors ship with a control panel, called Energy Saver, that powers down the monitor after a specified period of inactivity—the ultimate screen saver. Move the mouse, or hit a key, and the monitor springs back to life.

Berkeley Systems' After Dark 3.0 ($49.99; 510/540-5535) includes a power-saving module named EcoLogic that powers down your monitor and, if you like, the Mac itself. You can specify separate inactivity intervals for each. And no, you don't have to forgo the flying toasters—you can set up the infamous screen-saver module

continues

(or another module) to appear after a brief interval of inactivity, and have EcoLogic kick in after a longer one.

Your Printer

Printers impose significant resource demands of their own. The industry jargon for everything you put in a printer—paper, toner, and so on—would make any environmentalist cringe: consumables. Here are some ways to consume less.

4. Shop Energy Star. Most monochrome laser printers today have power-down modes that kick in after a period of inactivity. Just look for Energy Star compliance—that means a product meets the Environmental Protection Agency's energy-conservation standards.

5. Go ink-jet. Compact ink-jets such as Apple's Color StyleWriter 2400 use far less power than laser printers, and less plastic goes into ink-jet printers and their ink cartridges.

6. Print less. Use page preview to proof documents on screen. Use the page-reduction features most printer drivers provide to squeeze multiple pages on a single sheet of paper. (The layout feature in the LaserWriter 8 Page Setup dialog box is especially useful for this.)

7. Use both sides. Several workgroup laser printers on the market accept duplexer attachments that flip pages within the printer (see "Top Office Printers," *Macworld*, June 1995). You can also print on both sides manually. First print the odd-numbered pages of a document, then flip the sheets over and print the even-numbered pages. For multiple copies, print originals as single-sided copies and then use a photocopier to make the rest two-sided.

A variation on the both-sides theme: Don't throw away single-sided documents you don't need. Use them to print first drafts, E-mail, or other nonfinal output. If security or privacy requirements prohibit this, at least recycle the paper.

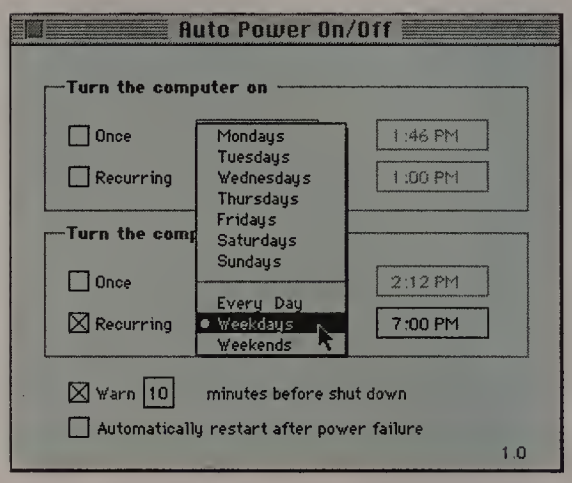


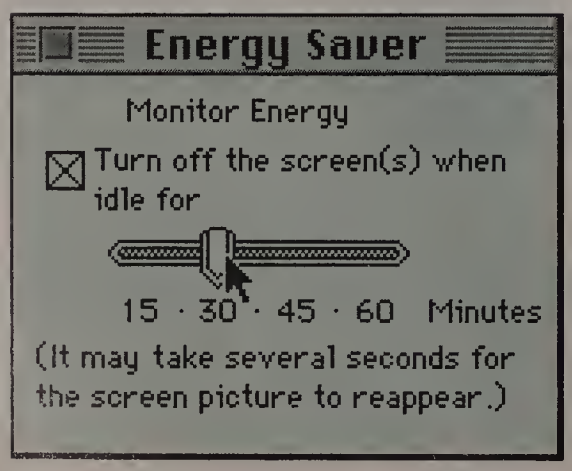
LUIS DELGADO

Solar-Powered Silicon The Neptune solar panel feeds your PowerBook on sunlight. When clouds roll in, you can zip the Neptune closed in its own nylon case.

8. Don't pitch toner cartridges. Don't trash that spent laser-toner cartridge—recycle it (all major printer vendors now have free recycling programs) or refill it.

9. Conserve toner. Working Software's Toner Tuner ($24.95; 408/423-5696) extends cartridge life by printing draft copies in gray, using less toner or ink. If you're using QuickDraw GX, get Peirce Software's Peirce Print Tools ($129; 408/244-6554). Its InkSaver module performs a similar job, and its PaperSaver module provides *n*-up printing.





Power Savers With System 7.5's Auto Power On/Off control panel (top), you can program the Mac to turn itself on and off at regular intervals. The Energy Saver control panel (bottom) included with Apple monitors shuts the monitor's picture tube off after a specified period of inactivity.

Your PowerBook

PowerBooks are designed around power conservation, so using one instead of a desktop Mac saves energy right off the bat. Batteries contain nasty toxins, but you can reduce their environmental impact by recycling them when spent. Combine a PowerBook with the following products to save even more.

10. Run on 12 volts. Most home alternative-energy products—solar panels, windmills, and the like—generate 12 volts of juice to charge car batteries, which in turn supply power to lights and appliances. You can run a PowerBook from a 12V power source using Lind Electronics' (612/927-6303) Automobile Power Adapter, which converts 12V DC into the lower-voltage DC required by a PowerBook. (One of these gems enabled me to keep working through a four-day power outage that struck the rural northern California coast during a winter gale last January. Even as 70-mph winds drove rain through the roof of his blacked-out house, your faithful correspondent was able to play Lode Runner—er, I mean, meet his deadlines.) A model that powers an Apple StyleWriter printer lists for $49. The PowerBook 100-series and Duo versions cost $69.95, while the PowerBook 500-series model is $99.95.

You can also use a DC-to-AC inverter to power your equipment from a 12V source. Radio Shack sells a variety of inverters, including big honkers that can power a small desktop Macintosh and monitor. Statpower Technologies' Notepower ($69.95; 604/420-1585) is a compact, 6-ounce inverter that generates enough juice to run a PowerBook using the AC adapter.

11. Run from the sun. You can get one step closer to the ultimate power source with Keep It Simple Systems' (800/327-6882) Solar System series—solar panels that, in direct sun, generate enough juice for a PowerBook. The $229 Neptune Model I tested was thoughtfully designed. Closed, it's an 8-by-14-inch nylon case less than an inch thick. Open it flat, and two amorphous silicon panels begin delivering 8.4V to a 10-foot cable that you plug into the PowerBook's adapter jack. Models are available for all PowerBooks (and other laptops).

Everything Else

12. Recycle it. And I don't just mean recycling toner cartridges and paper. Donate old versions of software to a school or charitable organization. And if you work for a big business, recycle your equipment—too many retired computers and printers are aging in storerooms when they could be serving a school or organization that just can't afford the latest model. **m**

Contributing editor JIM HEID's latest book is the fourth edition of the award-winning *Macworld New Mac Handbook Plus Interactive CD* (IDG Books Worldwide, 1995). Its 1200 pages are printed on recycled paper.



Helpful advice.



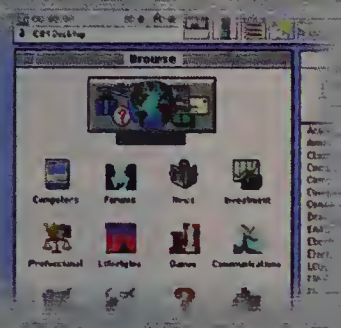
Stock updates.



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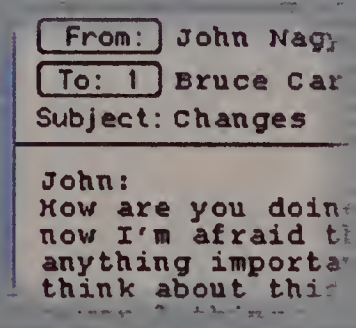


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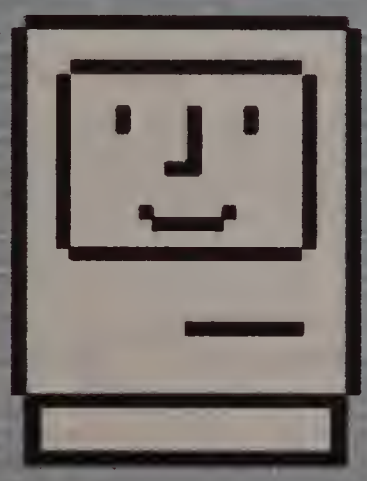
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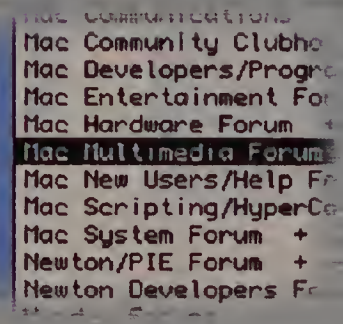




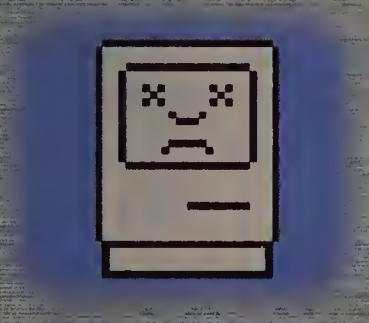
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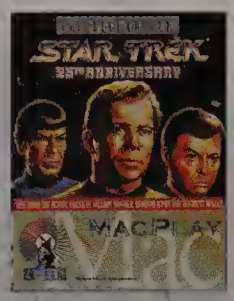
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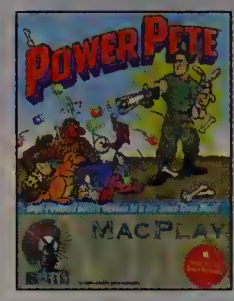
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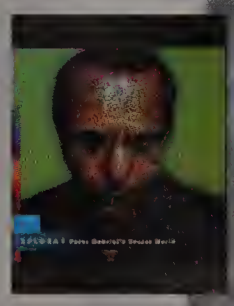
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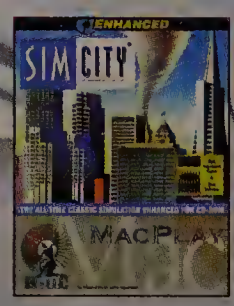
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CAP1








BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

ARE YOU UNIMPRESSED BY DULL PRINTS from low-cost color ink-jet printers such as Apple's Color StyleWriter and Epson's Stylus Color? You haven't seen what they can do with the right paper, say a couple of readers. René Korte of Hunstville, Alabama, claims no thermal-wax printer can come close to matching prints made with a Stylus Color on Hewlett-Packard's glossy paperlike film. At a dollar a page it's a rather expensive method, but it's still substantially cheaper than dye-sublimation printing ($5 per page). Granted, dye sublimation looks great, but Korte contends it is sheer overkill for the average home or business.

Before printing with a Stylus Color, open the image and use the Page Setup command to specify 720-dpi printing. The only paper choice at that resolution is Epson 720 Coated; that's OK. Although it normally has trouble taking up the film, the Stylus grabs it just fine if you put a strip of transparent tape at the top edge of the film on the nonprinting side. The printer takes its sweet time to print a full page in color, but Korte says it's worth the wait.

For printing on an Apple Color StyleWriter Pro, designer Robert B. Riggs of Canton, Michigan, recommends the paper and film made by Rexham Graphics (413/536-7800 or 800/628-8604 for a dealer referral), which he considers the best on the market. He gets richer color and greater contrast with Rexham RIJ90M ink-jet paper (about 10 cents a sheet) than with a Hammermill premium ink-jet paper (about 2 cents a sheet). For even better contrast, sharpness, and clarity, he uses Rexham DMPL160HP low-glare photographic paper ($152.95 for 25, 24-by-36-inch sheets that he cuts down to 8½ by 11 and 8½ by 14). Rexham expects to offer this type of paper in an 8½-by-11-inch size by fall 1995.

When Slow Is Fast Enough

Q Like everyone else, I need more disk storage. Removable-cartridge drives seem attractive, but they provide seek times of 18 milliseconds and slower, compared with 11ms or 13ms for hard drives. How noticeable is the difference in access time? Is it feasible to run applications from something as slow as Iomega's Zip drive?

Dave M. Peck, Sr.
via CompuServe



A According to Tim Warner, a senior technical analyst for Macworld Lab, the Zip drive feels about as fast as an 80MB hard drive did four years ago, which means it's noticeably slower than today's hard drives (see *Reviews, Macworld*, July 1995). How much slower depends greatly on the types of applications you use and what you do with them. You don't need blistering disk performance for word processing, spreadsheets, communications, ordinary business graphics, playing QuickTime movies, and many other everyday tasks.

The Zip makes a fine backup device, performs adequately as a start-up drive, and doesn't feel particularly sluggish running graphics applications such as Adobe Photoshop and Fractal Design Painter—as long as you're editing images that fit entirely in memory, and you don't use the Zip as a scratch disk. However, you'd cry if you had to use a drive with seek times as slow as the Zip's for random-access tasks such as sorting large databases or compiling programs, and you need a fast transfer rate for virtual memory storage or a Photoshop scratch disk. (Use your internal or external hard drive for those jobs, even if you start up from a Zip.)

Before buying a Zip drive, take a look at the new SyQuest EZ135 Drive, which the company claims offers about twice the performance for the same price (see *MacBulletin*, July 1995). Also, don't overlook the fact that you can buy a pretty big hard drive for the cost of a Zip drive and the equivalent number of Zip disks—at least 500MB now and going up as hard drive prices tumble.

Desktop Rebuilding and At Ease

Q When I tried to rebuild the desktop on my Performa 475 with At Ease installed, the rebuild froze just before it finished. Must I turn off At Ease prior to rebuilding the desktop, or was this a random occurrence?

Greger J. Olson
via the Internet

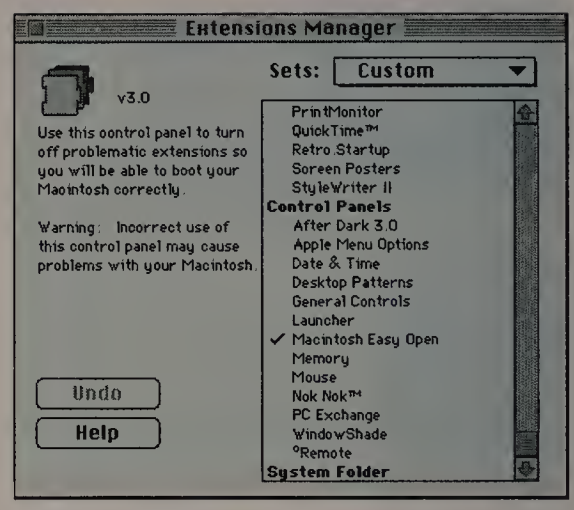
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A If you have access to the Finder from At Ease, and the Finder is not already open, you can rebuild the desktop by choosing Go To Finder from At Ease's Options menu and holding down the option and ⌘ keys until a dialog box asks you to confirm rebuilding the desktop. If you don't have access, you must turn off At Ease with the At Ease Setup program before rebuilding.

Here is the normal procedure for Mac OS versions 7.5 and later, as well as for other versions that have Macintosh Easy Open installed. Restart and hold down the spacebar until the Extensions Manager control panel opens. Name and save the current set of extensions by choosing Save Set from the pop-up menu. Then turn off all extensions by choosing All Off from the pop-up menu, but scroll through the list and click the Macintosh Easy Open control panel to turn it back on (see "Desktop Rebuilding with Easy Open"). Close Extensions Manager and hold down option-⌘ until you are asked to confirm rebuilding the desktop. After rebuilding, open Extensions Manager, choose the set of extensions you saved prior to rebuilding, and restart.

On systems prior to version 7.5, which generally do not have Easy Open installed, rebuild the desktop by restarting while holding down the shift key to turn off all extensions temporarily. When you see the message "Welcome to Macintosh. Extensions off," release the shift key and hold down option-⌘ until asked to confirm rebuilding.

Rebuilding the desktop normally causes all Get Info comments to be lost. You can keep them by installing the freeware extension CommentKeeper prior to rebuilding. If your problems continue, try clearing the desktop database with a freeware program—either Reset DTDBs 2.0 or TechTool 1.0.6—then rebuild again. Norton Utilities 3.1 can also clear and rebuild the desktop without losing Get Info comments. CommentKeeper, Reset DTDBs, and TechTool are available in the Macworld forums on America Online and eWorld.



Desktop Rebuilding with Easy Open Before rebuilding the desktop with any System version that has Macintosh Easy Open installed, use the Extensions Manager control panel to turn off all other extensions. Some extensions prevent Macintosh Easy Open from adding information to the desktop files during rebuilding, and as a result the system tries to rebuild the desktop on every restart.

⌘-Keys for Application Menu

TIP You can make the Application menu's Hide and Show commands as convenient as they are useful by assigning them ⌘-*key* shortcuts. Use ResEdit to open a copy of the System file; in System 7.5.1, open the System 7.5 Update file instead. Then open that file's MENU resource -16489. A menu-editing window opens, showing the Application menu with the name of Maura (see "Application Menu Shortcuts"). Select each of the first three menu items in turn and set the Cmd-Key field as you wish. I use an asterisk (*) for the Hide ^0 item (which hides the frontmost application), a hyphen (-) for the Hide Others item, and a plus sign (+) for the Show All item.

After making those changes, select

continues

"Can you make that green a bit more blue but not so BLUE it's navy and not so yellow it's lime? I mean I want red in the green to BROWN it up a bit. Would that look good on a peach background? Ummm, about that background color..."

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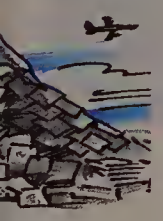
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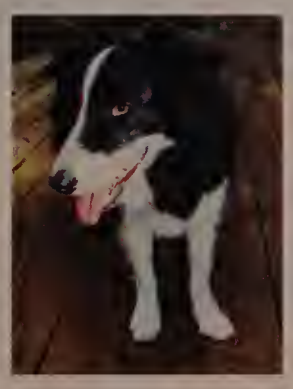
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4. *Retrospect teams up with tape or cartridges.* It's no wonder Retrospect's bundled with just about every Macintosh tape drive sold. It's no slouch with SyQuest, MO, or Zip drives either – put them together with Retrospect and you've got a powerful backup machine.

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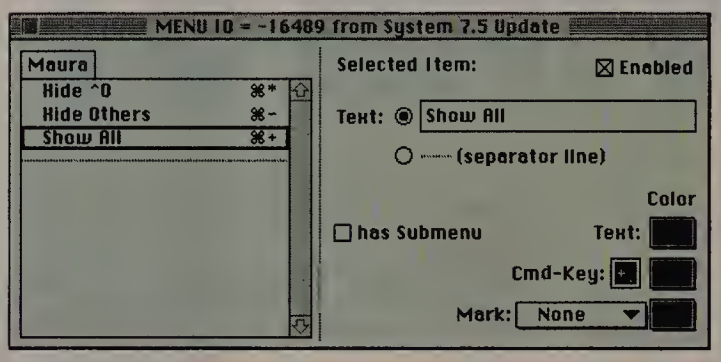
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Circle 26 on reader service card

the menu items individually, and for each one try to choose Remove Icon from ResEdit's Menu menu. This step is necessary because in some systems the Hide and Show commands are marked as having icons even though they don't. In that case, specifying ⌘-*key* equivalents for those commands causes the Mac OS to bloat the Application menu with blank space the size of a standard icon for each command. If the Remove Icon command is grayed out, then your system doesn't have icon space to remove.

Save the edited copy of the System file or System 7.5 Update file and close it. Drag the original unedited file out of the System Folder and rename the edited file with the same name as the original. When you restart your computer, the Show and Hide commands will have the keyboard equivalents you assigned them.

Tom Carruthers
Laurel, Maryland



Application Menu Shortcuts ⌘-*key* equivalents for the first three items in the Application menu are specified in MENU resource -16489 of the System 7.5 Update file, or in the System file for Mac OS versions prior to 7.5.1. You can edit the resource with ResEdit.

Apple Speakers Drop Out

TIP Though my Power Mac 7100/80AV recognizes audio CDs, the sound periodically drops out. An alert Apple technician told me my AppleDesign Powered Speakers have a noise-gate circuit that's meant to suppress background noise while the speakers are amplifying sounds (such as an alert) from the computer. The circuits turn off the speaker input when the sound volume drops below a certain level. Quiet music passages from a CD may fall below that cutoff. The solution is to feed the sound from the computer's sound-out port to the speakers' dual RCA phono jacks with a Y-adapter cable that's available at Radio Shack and other electronics stores. The noise gate is only connected to the speakers' ⅛-inch stereo jack, not to the dual RCA phono jacks.

Robert Denn
Winchester, Massachusetts

You may be able to use the regular cable if you turn up the volume in the Sound control panel; compensate for that by lowering the volume on the speaker. This problem doesn't affect the smaller, cheaper AppleDesign Powered Speakers II, because they don't have the noise-gate circuit. By the way, if your powered speakers are picking up AM radio broadcasts, try using higher-quality shielded cables. Unshielded cables can act as an AM antenna, picking up radio signals that powered speakers may amplify along with sounds from the computer.—L.P.

Netscape Bookmarks Redux

TIP Here are more ideas to add to those presented last month for organizing Netscape Navigator bookmarks more quickly. Instead of allowing the Add Bookmark command to put each new bookmark at the bottom of the Bookmarks menu, you can have Netscape automatically place new ones in a new submenu near the middle or top of the menu (see "New Bookmarks"). Keeping new bookmarks together in a submenu is also an advantage later, when you want to move them into more permanent locations. Rather than tediously moving each new bookmark through the list of menu items in the Bookmarks window, you can move the submenu as a group by simply selecting the submenu's name in the list

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Some people donate money to keep the air clean. Jeff Angus wrote 2000 lines of code.

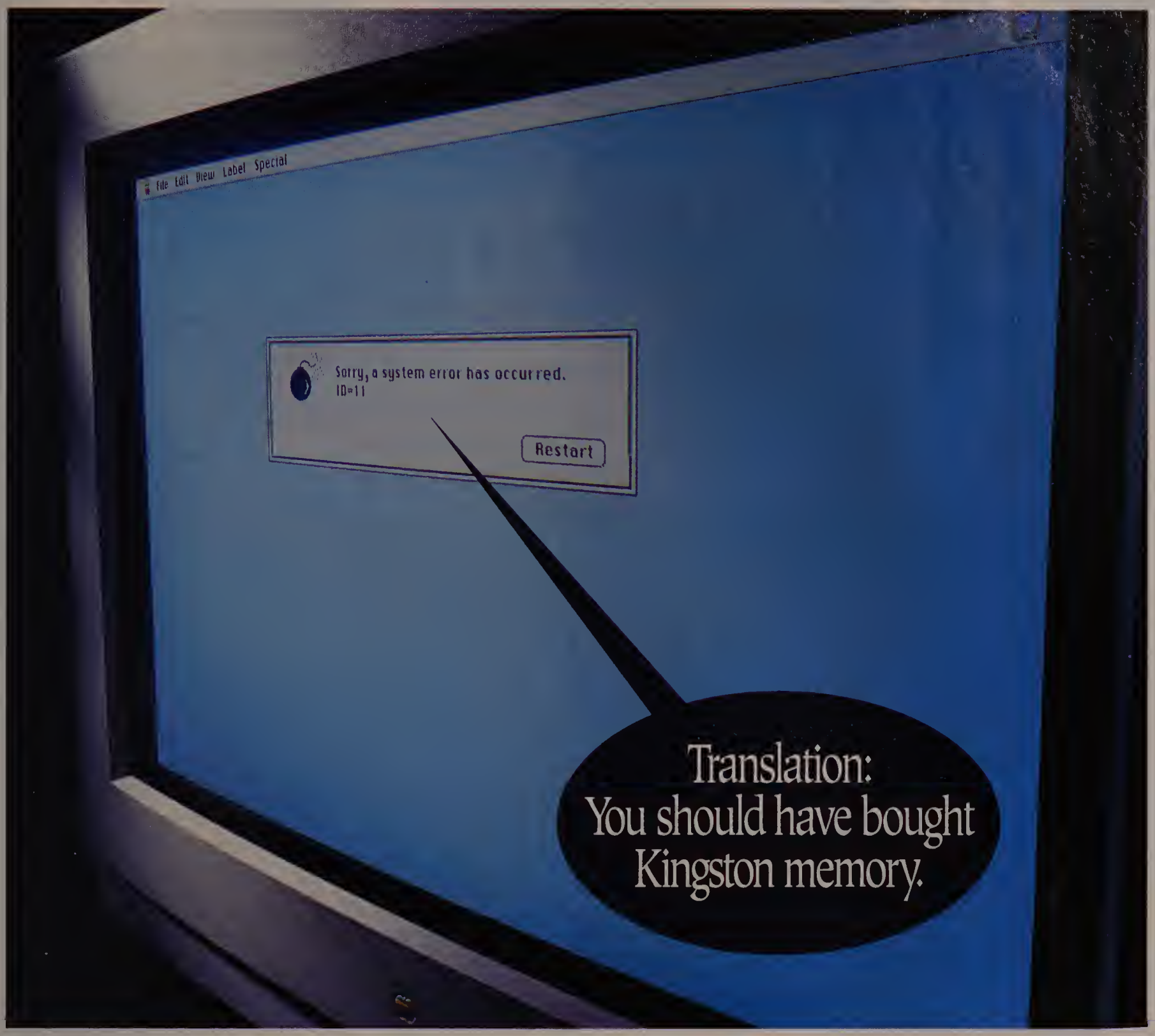
Jeff Angus has regularly donated money to the Natural Resources Defense Council. Now he also supports them in a different and maybe even more valuable way. By donating his skills to modify a dBASE program that generates customized reports about toxic substances.



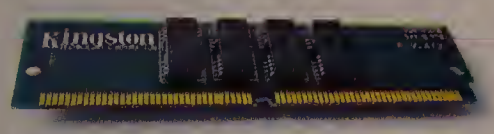
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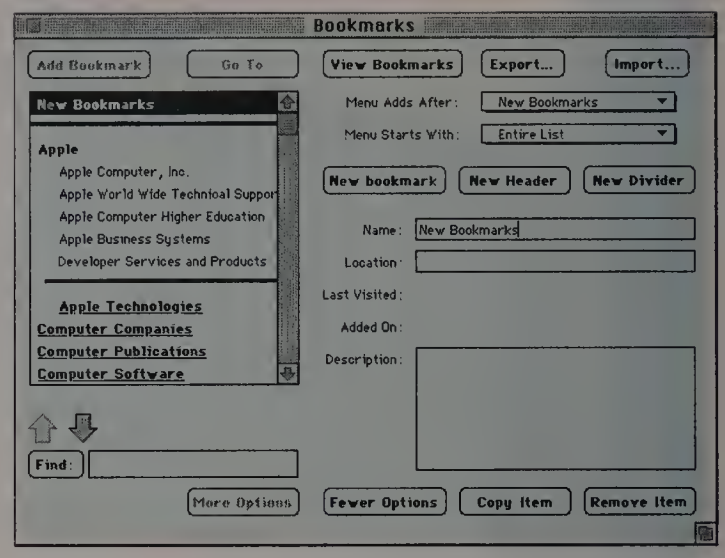
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and clicking the arrows displayed under the list. As you move the group through the list, you can drop off new bookmarks by selecting one at a time and moving it above the submenu name.

Here's a quick way to move a bookmark up or down in the Bookmarks menu while connected to the Internet. Open the Bookmarks window and double-click the bookmark's name to go to the corresponding Web page. In the window's scrolling list, select the item just above where you want to place the bookmark and click the Add Bookmark button. Finally, select the old bookmark and click the Remove Item button. This method is usually much faster than clicking the up and down arrows in the Bookmarks window and has the added advantage of confirming the Web page's URL link.

Chris Vargas
Wilmington, Delaware



New Bookmarks To add new bookmarks in Netscape, open the Bookmarks window (by choosing View Bookmarks from the Bookmarks menu), create a new submenu by clicking the New Header button, type the submenu's name in the Name field, and click the up arrow under the list to position the new submenu at the top of the Bookmarks menu. Then choose the new header from the Menu Adds After pop-up menu. Now, when you choose Add Bookmark from the Bookmarks menu, the new bookmark appears in the submenu named by the new header.

Launcher Follow-Up

When Brian D. Card of Springwater, New York, grouped items in the Launcher by placing them in specially named folders inside the Launcher Items folder (as described in the May *Quick Tips*), he found he could create only eight groups and wondered if that was the limit. In fact, you can create any number of folders whose names begin with a bullet (press option-8) in the Launcher Items folder, but the Launcher only displays category buttons for the seven whose names come first alphabetically. In addition it displays a category button named Applications, and that category contains everything in the Launcher Items folder except the seven specially named folders for which the Launcher makes category buttons.

Incidentally, installing System 7.5 Update 1.0 enhances the Launcher in two ways: you can choose from three icon sizes in the Launcher window, and—without opening the Launcher Items folder or its subfolders—you can drag icons to, from, and within the window (such as opening a document by dragging it to a compatible application in the Launcher). For instructions, look midway through the update's read-me file.

In Retrospect

Reading my suggestions in the June issue about copying a large Retrospect catalog to a set of floppy disks prompted Craig Isaacs of Dantz Development to send in a homegrown alternative plus several other Retrospect tips.

To archive a Retrospect catalog or any other large file on floppy disks and automatically split the file across as few disks as possible, you can have Retrospect back up the file to a Macintosh Disks type of StorageSet. You can use the same technique to copy any selection of files and folders to any kind of removable disk.

Other tips: There is a unique two-letter shortcut for every button in Retrospect's Directory window. For example, instead of clicking the Backup button in the Immediate operations panel, just type the two letters **IB** (*I* for Immediate and *B* for Backup). Anywhere you use a Delete or Duplicate button you can suppress the confirmation dialog box by option-clicking the button. To minimize scrolling in a dialog box, such as the one that lists catalogs and StorageSets, you can enlarge it by pressing ⌘-shift-~; press again to reduce its size. This keystroke works like the zoom box in the upper-right corner of a regular window. **m**

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

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A Checklist for Switch Shopping

INDUSTRY ANALYSTS AT DATAQUEST predict that Ethernet switch purchases in 1995 will soar to $837 million—nearly three times the previous year's already record-breaking sales. Why are Ethernet switches becoming such hot sellers? Because switches, which multiply network bandwidth by interconnecting LAN segments at high speeds, offer higher performance than bridges and hubs; are easier to install and maintain than routers; and let network managers preserve their investment in Ethernet cables, software, and network-interface cards. And as prices drop and new features such as virtual LANs appear, switches are becoming even more attractive.

Nearly three dozen vendors are selling Ethernet switches, including Cisco Systems, 3Com, Digital Equipment Corporation (DEC), Sonic Systems, Alantec, and Tribe Computer Works. That's an overwhelming number of choices, so before you start shopping for a switch, take a close look at your users' present—and future—bandwidth needs. Ask yourself how much you expect your workgroups to grow over the next few years, how many file servers and other devices you need to connect to your switches, and what your plans are for installing a high-speed network backbone.

When you've decided how switches will fit into your network configuration, start looking for a switch that has the performance you need. The one you choose should have a big enough backbone and enough processing power to transfer data simultaneously between all of its port pairs at full Ethernet speed—14,880 packets per second. Decide whether you need a desktop switch, which delivers 10 Mbps of dedicated bandwidth to each user through a single port, or a workgroup switch, which allows each 10-Mbps port to handle several users and devices.



KEVIN CANDLAND

Sonic Systems' EtherSwitch (top), Tribe's TribeSwitch, 3Com's LinkSwitch, and Grand Junction's FastSwitch

You'll also need to decide whether to buy a switch based on cut-through or store-and-forward technology. A cut-through switch, which has low latency but performs no error checking, might be your best bet if the number of bad packets on your network is small and you need the speed. If lots of errors are affecting your network's performance, you might want a store-and-forward switch, which has slower throughput but checks packets for errors before processing them. Some switches, such as Grand Junction Networks' (510/252-0726) FastSwitch, can operate in either cut-through or store-and-forward mode.

If you plan to connect your switches to high-speed backbones or a group of servers, you also need to make sure the switch you choose comes with one or more high-speed FDDI, Fast Ethernet, or ATM ports. To accommodate growing network needs, make sure you can add high-speed ports in a modular fashion to the switch you choose.

Don't forget to consider per-port cost, which may determine which switch you buy. Be sure to include in the cost of the unit any high-speed ports you'll need. Some vendors advertise a low per-port cost and then tack on up to $2000 for each additional high-speed port.

Still, there's good news as switch prices continue to drop. Earlier this year, for example, Grand Junction Networks slashed to $199 per port the price of its 25-port FastSwitch 10, a desktop switch that delivers a full 10-Mbps bandwidth to each desktop user on a network. Pushing prices even lower is start-up Amber Wave Systems (508/266-2900), which will be offering its new 32-port workgroup

switch, AmberSwitch, at $5595, or $175 per port, when the switch ships in July.

And while prices go down, new features are being added. Market leaders Cisco Systems (408/526-4000) and DEC (508/692-2562), for example, are adding virtual LAN (VLAN) capabilities to their switching products. VLAN saves money as you add, move, or change network access for employees. And the technology increases network security because it allows network managers the welcome ability to link individual users or project teams based on logical functions rather than physical location.

DEC will add VLAN support to its new Portswitch 900 family of products: the Portswitch 900TP ($5500), a 32-port 10BaseT unit, and the Portswitch 900CP ($5500), a 16-port 10Base2 switch. Cisco Systems will add VLAN capabilities to its new Kalpana ProStack switching system. ProStack is a new concept in switching that lets network managers connect multiple switches into a stack that contains up to 192 Ethernet connections at 10 Mbps but can be managed as a single device. It is built around the new 16-port EtherSwitch Pro16 ($7200), which is now shipping.—MARTHA STRIZICH

IN BRIEF

■ **Dayna Restructures** Dayna Communications (801/269-7200) has launched two subsidiaries devoted to remote-access technology and wide-area wireless communications, while the parent company will focus on local area network products.

Meanwhile, Dayna is introducing a new line of 100-Mbps Fast Ethernet devices late this summer. First to arrive will be the $399 BlueStreak 10/100 NuBus Card and $259 BlueStreak 10/100 PCI Card, due in August. These will be followed by the BlueStreak 100BaseTX Hub (price not set) and a 10/100-Mbps bridge.

■ **Using PowerTalk** In-house software developers moving to take advantage of the Apple Open Collaboration Environment (AOCE) are finding that they can automate workflow processes and other tasks by taking advantage of the PowerTalk 1.1 extensions included with System 7.5. One helpful resource for these developers is the International PowerTalk/PowerShare User Group. A $40 membership includes a CD-ROM with tools, sample code, and the archives of the popular University of Michigan AOCE mailing list, which includes AOCE developers at Apple. For more information, E-mail **gademsky@powershare.batnet.com**.

Top Ten Internet Addresses

MAC NETWORK MANAGERS WITH Internet accounts have access to valuable constellations of network information. The problem is finding them in the vast Internet universe. Here's some help—*Macworld*'s top ten Internet sites.

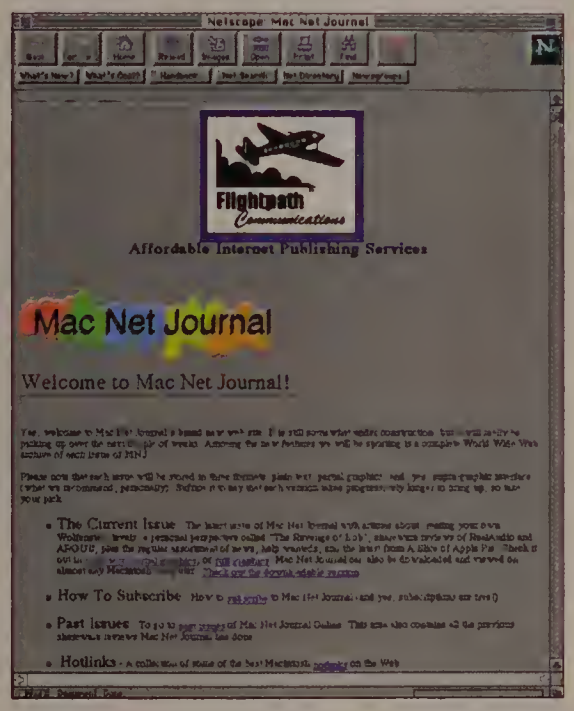
You can use any World Wide Web browser to access these Web sites, but you'll need a browser with a built-in news reader to access the newsgroup at number 8. Don't be surprised if you can't get through to some of these addresses on your first try; popular Internet addresses are often busy.

1. **http://spock.austin.apple.com/cool.tools.html** Last September Apple issued Internet Cool Tool awards for Internet programming efforts to 11 individuals and organizations for their fabulous freeware and shareware creations. This site lists those worthies and links you to their sites. Winners for 1995 should be added by September.

2. **ftp://amug.org/pub/peterlewis/** Peter N. Lewis is probably the most prolific author of Macintosh networking shareware. Here's the cache of all his current riches.

3. **http://wwwhost.ots.utexas.edu/mac/internet-archive.html** This University of Texas page is one of the best jumping-off places for networking shareware.





4. **http://alumni.caltech.edu/~dank/isdn/** ISDN is a hot topic in connectivity. Dan Kegel's ISDN page is an exhaustive index of all things ISDN, including things Macintosh.

5. **http://www.dgr.com/web_mnj/** Aaron Anderson's Mac Net Journal focuses on Macintosh networking topics. This free online magazine is readable both online and as a slick downloadable multimedia program.

6. **http://www.ncsa.uiuc.edu/SDG/Software/Brochure/MacSoftDir.html** The National Center for Supercomputing Applications developed the first WWW browser—Mosaic—and NCSA's Telnet application is one of the most versatile terminal-emulation tools around. Get the latest versions of both here.

7. **ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/US/Macintosh/Networking.and.Communications/** This long and unwieldy URL leads you to Apple's own Networking and Communications software update library—a priceless site.

8. **news:comp.sys.mac.comm** This newsgroup discusses anything and everything related to Macintosh communications. WWW browsers with built-in news readers (such as Netscape Communications' Netscape Navigator) can read the newsgroup using this URL.

9. **ftp://rtfm.mit.edu/macintosh/comm-faq/** The mother lode of all FAQ (frequently asked questions) documents is MIT's RTFM site. This URL points to the Macintosh networking FAQ there.

10. **http://www.dartmouth.edu/pages/TidBITS/TidBITS.html** For Macintosh news of any kind, and networking news in particular, read our perennial favorite—Adam Engst's free TidBITS newsletter. It offers one-stop shopping for networking coverage.—MEL BECKMAN

Before you buy a color printer, you'd better double-check your facts.

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DUAL TECHNOLOGY	√√	
ADOBE POSTSCRIPT LEVEL 2	√	√
33 MHZ RISC PROCESSOR	√	
135 ADOBE TYPE 1 FONTS	√	
AUTO TRIM (Automatically cuts paper/OHP)	√	
INTERNAL HARD DISK (No additional RAM needed)	√	
4-COLOR FULL-BLEED PRINTING (Right out of the box!)	√	
INDUSTRY-STANDARD COLOR MANAGEMENT	√	
DCS FILESUPPORT	√	



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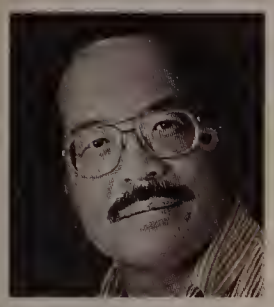
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BY CARY LU

PowerBook Notes

Charting the PowerBook's Progress

THE IMMINENT INTRODUCTION OF A new generation of PowerBooks marks a good time to evaluate your choices, reflect on how far laptops have come, and predict how they'll evolve from here.

Should You Buy a New One?

With the PowerPC PowerBooks about to ship, you're probably wondering whether to buy one of the new models, keep your present PowerBook, or simply upgrade your processor. Well, that depends on several factors: what model you currently own and what you use it for, what features you need or want, and how much you're willing to spend.

The new PowerBooks' key improvements—a PowerPC processor, built-in support for PC Cards (formerly PCMCIA cards), an infrared interface, and the latest battery technology—don't represent must-have features for most people. But if you find one or more of them useful and you don't mind paying the premium the newest hardware always commands, then you'll probably find these a better choice than any earlier PowerBook.

Or Take the Upgrade Route?

If you have a Duo or a 500 series, you have another option—upgrading to a PowerPC CPU. (For more information about CPU upgrades, see *PowerBook Notes*, February 1995.)

Should you upgrade? If the PowerBook is your only Mac, an upgrade may make sense, depending on Apple's pricing. But if your primary Mac is a desktop model, a PowerPC upgrade for a PowerBook is less compelling. The applications that benefit most from a PowerPC—high-end graphics, page layout, CAD—are rarely done on a PowerBook. For word processors, personal information managers, and the average spreadsheet, a faster CPU may not produce any dramatic improvement. Remember, the upgrade affects only the CPU; the hard drive speed won't change, and starting up and waking up won't significantly improve. Eventually, new software will support only the PowerPC CPU, but that won't happen to mainstream programs for several years, time enough for at least one more generation of PowerBooks beyond this year's introductions.

A PowerPC CPU incorporates a floating-point unit (FPU), but it can handle floating-point calculations only for native PowerPC software; the FPU won't work with 680X0 software. For 680X0 programs that do intensive math, adding an FPU improves performance far more than upgrading a 68040 to a PowerPC.



Sonnet Technologies (714/261-2800, 800/945-3668) upgrades a 500 series or a Duo to a 68040 for $449 ($349 each for customers who order ten upgrades and are able to do a daughterboard swap). Dynamic Engineering (408/336-8891) charges $449 for a 500 series, and $499 for a Duo. Sonnet's upgrade leaves all PowerBook models with a 33MHz clock speed; Dynamic boosts the 500-series models' speed to 36MHz, but will, on request, leave the speed at 33MHz for an additional safety margin. Thus far, users have reported no heat problems with the FPU and speed upgrades.

The FPU upgrade does cost some battery life—between 10 and 20 percent. And the higher the speed, the greater the power consumption.

Evaluating Your PowerBook

The 500 Series When judged by its hardware features, the 500 series will probably remain the high-water mark for all-in-one PowerBooks. No previous models provided for an internal modem, Ethernet, and two batteries. Future PowerBooks will leave modems and Ethernet to PC Cards. But the 500-series models have their limitations: they're heavy and bulky; the internal modems are limited to 14.4 Kbps (you can get 28.8 Kbps in a PC Card modem); and the keyboards are problem prone, especially if you hit a key off-center. However, their nickel–metal-hydride (NiMH) batteries do work well, and the built-in power manager can be programmed to handle lithium-ion batteries, although such batteries are in short supply.

The Duos These remain excellent subnotebook computers, constrained mainly by a 14.4-Kbps internal modem and the inability to accept PC Cards. The Apple MiniDock provides all the standard ports (except Ethernet), while Apple's full-size Duo Dock turns a Duo into a desktop Mac. Specialty docks from Newer Technology (316/685-4904, 800/678-3726) address most traveling needs.

The PowerBooks 140 to 180 The older PowerBooks are showing their age. The portability of these models is seriously limited by their internal nickel-cadmium (NiCd) batteries: a six-hour recharging time, compared with two hours for newer PowerBooks. As a result, many users have purchased external batteries, adding considerably to the weight and bulk they must carry around. The color models—the 165c and 180c—have very short battery life, making external batteries virtually a necessity.

The 100 series (except for the 100 and

continues

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150) were the only PowerBooks with two serial ports (but no Ethernet). The $99 PB Serial Adapter from Sigma Seven Systems (604/743-2416) adds a second serial port to both the 150 and the 100 by plugging into the modem slot.

A PowerPC upgrade for the 100 series is technically possible but impractical for such old models. So don't expect to see any, since Apple won't make one and no one else has access to the necessary boot-up ROM code.

The PowerBook 100 and Mac Portable

The 100 remains in some ways the best PowerBook; it's nearly as small and light as the Duos (and like them, lacks a floppy drive), but it has built-in SCSI and ADB ports. Most important, it's still the only PowerBook that can handle a RAM disk gracefully; you can turn off the hard drive completely while working in a RAM disk, and RAM contents remain even after shutdown. The 100 runs efficiently on a tiny System, the nearly impossible-to-find System 6.0.8L. Dynamic Engineering says it still plans to have a 68030 upgrade for the Mac Portable by the end of the year; it hopes to offer a similar upgrade for the 100, but that would require an external battery, making the computer much less convenient.

How Far Have We Come?

Because of market demand, PowerBooks—and Windows laptops—are essentially miniature desktop computers, running the same bloated operating systems and applications software as their desktop cousins. The only real concession to portable operation, battery power management, is merely tacked on rather than an inherent part of the system. Despite ever faster processors and more megabytes of RAM, today's laptops respond very slowly at critical times. Current PowerBooks take over 45 seconds to start up with extensions off, 10 to 12 seconds to wake up (add 3 seconds with AppleTalk turned on), and about 8 seconds to spin up the hard drive.

Why should we have to put up with such sluggish performance? As far back as 1983, the very first laptop computer, the 4-pound Radio Shack TRS-80 Model 100, woke up in less than a second, ran on batteries for 15 hours, and held everything in static RAM—you never had to save a file. Of course, today's PowerBooks have far more computing power, but in many ways the Model 100 is still arguably a better *portable* computer.

Carrying on the tradition of the Model 100 is the 2-pound AlphaSmart Pro ($329; $279 to the education market) from Intelligent Peripheral Devices (IPD; 408/252-9400). IPD claims that the AlphaSmart runs for over 60 hours on two AA batteries. But its tiny screen shows a scant four lines of 40 characters each, and its only software is a simple text editor. The AlphaSmart stores 128K of text and connects to a Mac via the ADB port.

There are other portable computing devices, but if you need one—as I do—mainly for writing, most fall short because they either have too small a keyboard (such as the Psion) or lack one altogether (as does the Newton).

The Future of Laptops

In the four years since the first PowerBooks appeared, most improvements in laptop hardware have been modest. The next four years promise more-interesting developments. The cost of active matrix color displays should start dropping considerably later this year, since LCD makers can now build many more such screens than the market demands. Many companies are working on field emission displays (FED), which work like an array of miniature CRTs, promising better image quality, higher resolution, and much lower power consumption than active matrix LCDs.

Hard drives will remain the principal laptop storage medium for this decade. Solid-state memory in the quantities that users crave will be too expensive. Opticals consume too much power to be a laptop's primary drive, while the 100MB and 135MB magnetic cartridges hold too little data. And most of the current 3.5-inch optical and magnetic cartridge drives don't come in thin-enough packages, but Fujitsu has a 230MB optical drive—and will soon have a 640MB one—small enough to be interchanged with a floppy drive. The 4.7-inch size of CD-ROMs is very awkward for laptops. A 3-inch CD-ROM format does fit easily into a laptop drive bay, but aside from titles for Sony's handheld Data DiscMan, no software comes in that size.

So what should the next PowerBook offer? Number one, of course, is long battery life—but don't expect to see the 15-hour battery life I got with Radio Shack's Model 100 anytime soon on a full-featured laptop. Beyond that, I envision a faster machine, patterned on the PowerBook 100, with a lean operating system and applications running in a RAM disk; on the flip side, it should also provide all the options of a desktop Mac when starting from the hard disk. I just hope there's enough demand for such a machine to convince Apple to develop one. **m**

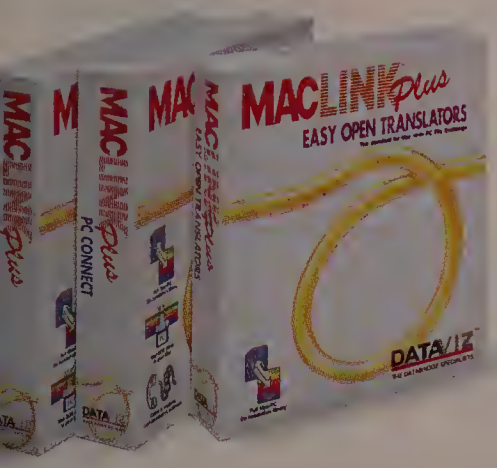
CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column.

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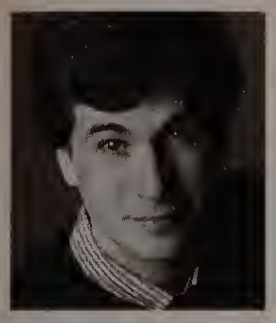
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BY DAVID POGUE

Clip 'N' Save

Now that we've got multimedia, what do we keep it in?

LET ME BOUNCE A THEORY OFF you: The technological progress of the Macintosh can be measured by that humblest of desk accessories—the Scrapbook. With each new digital medium comes the need for a new type of Scrapbook. First Apple rewrote the Scrapbook to accommodate color graphics, then to hold sounds, then for QuickTime movies. As a matter of fact, Apple has recently been demonstrating yet another version of the Scrapbook, this one incorporating the upcoming QuickTime 3-D technology; it accepts 3-D images that you can spin around to different angles.

Let me bounce another theory off you: The Scrapbook is lame. Here we are, cruising toward the year 2000, and this vehicle shows you only one stored item at a time. You still can't search for a particular item (except by clicking through page after page). You still can't type in searchable keywords or descriptions of each item. Yes, I know, System 7.5's Scrapbook finally has a resizable window—believe me, I'm hysterical with gratitude. But there's still no index, no editing functions, . . . not even a Print command, for the love of Mike!

Of course, I've got one more theory: Anything Apple doesn't do exactly right, somebody rushes in and does better. In this case, several somebodies. For the benefit of desktop publishers, graphic artists, and multimediacs of every ilk, here's a rundown of replacements for that disorganized multimedia shoebox in your Apple menu. (I've put the shareware programs in the Macworld forums of America Online and eWorld.)

ClipClop 1.1

As an example of independent minds outdesigning Apple, examine this $14 shareware item by Michael Budiansky.

Instead of using the page-at-a-time metaphor of the Scrapbook, this program splits its window in half. The left side shows thumbnail (miniature) views of the current file's *entire* contents, automatically resized according to the size of the window and number of items. Click on an item to see it, actual size, in the right side of the window.

Unfortunately, ClipClop can't store QuickTime movies. And, although it seems like a good idea at first, that business of fitting all the thumbnails into the window quickly becomes ridiculous. By the time you've pasted in, say, 30 images, they've shrunk to the size of molecules. Programming tip: Wouldn't a scroll bar be simpler?

ScrapIt Pro 4.01

This $15 shareware program, on the other hand, is ready for prime time (John V. Holder, 2862 Lowell St., Eureka, CA 95501). It gleefully accepts anything the Scrapbook takes, such as sound, text blocks from PageMaker, PostScript drawings from FreeHand, text, and—naturally—QuickTime movies. As with ClipClop, you get a split-screen design; this time, however, you can choose either a list view or a thumbnail view for the left pane (or you can hide it entirely).



ScrapIt Pro offers a few bonus goodies, too. For example, it can suck the graphics out of any program (the backdrop from a game, the start-up screen from your favorite program, and so on). You can name each scrapbook entry—and you can search, not just for a name, but even for words within text you've pasted in. (Text is definitely the program's strong point: you get in-scrapbook text editing—complete with font, size, and color—and a word-count command. Can you say *replacement Note Pad?*) Finally, the program will actually read your text items aloud (on speech-equipped Macs). Heck, that voice feature makes ScrapIt Pro even more technologically with-it than the actual Scrapbook.

Considering ScrapIt's thoroughly modern design (it supports System 7.5 drag and drop), its crude QuickTime-movie interface is surprising. The usual playback controller bar is missing, so you're forced to watch every movie from the very beginning. In every other aspect, however, this baby wipes the floor with Apple's Scrapbook.

Now Scrapbook 5.0.1

Nobody ever writes about Now Scrapbook ($129.95; Now Software, 503/274-2800). It's the component of Now Utilities that gets no respect. Well, *I* like it.

Actually, Now Scrapbook is surprisingly similar to ScrapIt Pro (see "Open Books"). It has the same basic design (list on the left, pictures on the right), same System 7.5 drag and drop, same text-editing abilities. But Now Scrapbook handles additional file formats (like TIFF, GIF, and JPEG), lets you crop or resize graphics, and—oh, yeah—comes with a passel of high-utility utilities (like Super Boomerang) at no extra charge. Now Scrapbook strikes a satisfying balance between the easy (but stripped-down) Apple Scrapbook and powerful (but tricky) Adobe Fetch.

Adobe Fetch 1.2

Adobe calls it a "tool for cataloging clip art, photo images . . . in a common visual database for browsing and retrieval." I guess if they're going to charge $300 for it,

continues



Open Books Two reinterpretations of a classic. Above: the shareware ScrapIt Pro. Below: Now Scrapbook. Each may be configured to resemble the other. Each beats Apple's Scrapbook cold.

they can't just say "scrapbook program."

OK, I admit it—calling Fetch a Scrapbook replacement is a little like calling the Pacific a puddle (single-user version $149, multiuser $295; Adobe, 415/961-4400). First of all, Fetch acknowledges more than the usual PICT, text, sound, and movie file formats—it handles Photoshop and TIFF files, for example, and other Adobe formats such as FreeHand and Persuasion.

Handily enough, you don't have to paste things into Fetch, either; simply dropping a folder full of media clips onto the program's icon enters them into the Fetch catalog. Furthermore, Fetch can track files on disks that aren't even in your Mac—the SyQuest cartridges in your drawer, for example. The program is available in a multiuser version, which means one Fetch database can list the files available on several networked Macs.

Despite all these beefy pro features, however, at Fetch's heart is, yes, a scrapbook program. You view either thumbnails or a list of item names; you double-click on a thumbnail to view the full-size image (or to play the movie or sound); a Find command locates words (among the keywords or descriptions you've typed up) or characteristics (data type, date, and so on). Just one warning: this program can be maddeningly slow, especially when 24-bit color thumbnails redraw (and there's no keystroke to interrupt the sluglike procedure). I didn't push Fetch all the way to its maximum 100,000 images per catalog, but it's a good bet that the speed doesn't improve as your catalog grows.

Kodak Shoebox 1.0.2

Every time I visit my parents' house in Cleveland, the kitchen-wall photograph of me in a junior-high production of *Dames at Sea* has faded another 10 percent. And every time, I cluck to myself that if that photo were on a Photo CD, it would remain in perfect condition forever. (Quick recap: A Photo CD is a CD-ROM containing your photos, created by a local Kodak developing joint for about $1 per picture.)

Shoebox is ideal for managing Photo CDs ($139; Eastman Kodak, 800/235-6325, 800/465-6325 in Canada). In many ways, it's like Fetch—Shoebox can catalog an entire folder at once, it can launch other programs (to edit something you're looking at), and it saves only pointers to the files on your disks (instead of storing the actual files).

But the interface is unique; it looks like a screen full of neatly arrayed 35mm slides on a light table (they even have realistic little white "cardboard" frames). You can rearrange the slides, crop them, and double-click on one to enlarge it to full size. When you've got them the way you like, the program can give you—what else?—a slide show.

Shoebox is a serious database, too. You can create up to 100 fields (such as date, film type, location, and so on) to fill in for each photo. Naturally, all this information is grist for the Search command.

Although it's a durned fine program, Shoebox doesn't *quite* qualify as a Scrapbook replacement; it accepts sounds, QuickTime movies, and graphics (PICT, TIFF, EPS), but not text. And—violation of violations—you can't *paste* into it! You can only import.

MultiClip Pro 3.1.3

MultiClip Pro stores its contents just fine: you can view your scrapbooked material (sounds, text, movies, EPS and PICT files) either as thumbnails or as a list. You can even edit text or graphics, right there in MultiClip Pro ($59; Olduvai, 800/548-5151).

But storing is boring. Where MultiClip really shines is in getting stuff in and out—without copy and paste. No matter what program you're using, one special keystroke (your choice) automatically tosses whatever you've selected into MultiClip's waiting clutches. You never have to leave your original application. Later, you can reverse the process: you can press a special Paste keystroke repeatedly; MultiClip, backstage, automatically coughs up your previously copied clips in reverse order.

In fact, yet another keystroke makes a menu of MultiClip's saved-up contents—boilerplate text, your logo, whatever—appear at your cursor click. Choose from that little pop-up menu to insert a MultiClip clip into whatever you're working on. (Are you listening, lawyers?)

If this all sounds sort of breezy and fun, maybe I've been unduly influenced by the program's breezy and fun manual. In any event, this is a well-executed program based on an irresistible idea.

Captivate 4.5

See if you can keep all of this straight. Captivate Store used to be called Click-Paste. It comes with a screen-capture program called Captivate Select, which for years was called Capture. Both programs, along with a simple graphics-viewing program called Captivate View, are sold today as Captivate 4.5 ($89.95; Mainstay, 805/484-9400).

Captivate View understands TIFF, GIF, and even start-up–screen graphics formats; View offers commands for cropping and rotating. Captivate Store, like MultiClip Pro, displays a pop-up menu at your cursor when you press the magic keys. In this case, however, it is a hierarchical menu listing the contents of a specified folder on your hard drive, which makes it easy to choose an item to paste into your document. This folder can hold text, PICT, sound, and movie files. (Captivate Store isn't compatible with Microsoft Word 6—but then again, what is?)

Trouble is, View and Store are too little, too separate. View should be able to hold more than one image at a time; Store requires too much setup (naming your files in advance, placing them in appropriate folders); and the two programs really ought to be combined, à la MultiClip. The crown jewel of the set is Captivate Select; it's the only commercial screen-capture program still on the market.

The Upshot

Do you really intend to forge ahead into the nineties with a multimedia holding tank that only shows one snippet at a time? If not, ScrapIt Pro awaits those on a budget; Now Scrapbook beckons to the utility-starved; MultiClip Pro calls out to those who do a lot of copying and pasting; and Fetch is always there for workgroup types and graphics jocks.

I know what you're thinking: Why should you replace your Scrapbook, if it works fine? Sure, and I know a woman who designs a monthly newsletter in TeachText, too. **m**

While he was writing his new book, *Mac FAQs [Frequently Asked Questions]* (IDG Books Worldwide, 1995), DAVID POGUE's exhausted arrival at the pillow each night gave *drag and drop* a whole new meaning.

EDITED BY MARJORIE BAER

Under New Management

Introducing Macworld's new consumer department

OVER THE COMING MONTHS you'll be seeing some changes in this department. First, as she announced in her column last month, Deborah Branscum, *Macworld*'s original Conspicuous Consumer, is moving on to tackle new journalistic challenges. She set a high standard during her six-year tenure, earning a reputation among readers and vendors alike as an outspoken advocate for the Macintosh user community. We wish Deborah the best of luck, and for our part, *Macworld*'s reconfigured consumer-affairs department is committed to carrying on the good work she began.

The *Conspicuous Consumer* column was conceived as a service for the Macintosh-using community. By providing advice on buying and using computer hardware, software, and services in this column, our goal is to help readers become better-educated consumers. Collectively, *Macworld*'s contributing writers are a vast source of wisdom (some of it gained through painful experience), and we'll be mining that rich vein for sage buying advice to pass along to you.

Our readers have never been shy about speaking their minds when they believe a company has wronged them. *Macworld* maintains consumer forums on America Online, eWorld, and now on our own World Wide Web page. Before you make an important purchase, check our forums for opinions on the product and the company you're considering giving your business. You might find information that will save you time, trouble, and moola. Similarly, the online forums are the place to share your recommendations with the reader community. But remember, in fairness to vendors and for your own protection, keep your comments judicious (no flaming, please). Libel laws apply to online communications. For guidance, see "Cyberspace Lawsuits," *Conspicuous Consumer*, May 1995.

New Light on Letters

The *Conspicuous Consumer* department will continue to be an unbiased intermediary in the event of disputes between consumers and companies. If you have a problem with a company, write to us. We'll forward your complaint to the company in question and attempt to obtain a satisfactory resolution. Beginning with this issue, we will publish a selection of the letters that come to us for action. For legal reasons, we must have your letter in writing, with your full signature; we can accept faxes, but not E-mail. Include as much specific information as you can, such as the date you purchased the product, the exact nature of the problem, the steps you've taken so far to resolve it, and the names of any company representatives to whom you've spoken.

Practicing Precaution

What, you say you haven't kept any of those records? Well, join the crowd. It's easy to get caught up in postpurchase euphoria and misplace the invoice (or—confess it— throw it out). Don't. Make it a habit to file the invoice away. Chances are you will never need it, but once it's gone, it's gone.



Another good habit to cultivate is jotting down notes when you call for customer service or technical support. Maybe you've finally passed through telephone limbo and reached a live service representative. Even if you're really steamed, take a moment to ask—politely—the rep's name; write it down and put it in the file along with your invoice. If your problem persists and you have to call back, you can save some time by talking with the same person and picking up where you left off. If your efforts to rectify the situation still don't yield a solution, talk to a higher authority. But chances are good that one call will suffice, and it's a nice touch to thank the customer-support rep by name when you sign off.

One last tradition we'll be maintaining here is to honor vendors that provide exceptional service with *Macworld*'s Service Hero distinction. You can post your nominations in our online folders or send them to us by mail or fax.

Watch this space for further developments in *Macworld*'s consumer-affairs department, and keep in touch. The more intelligence we receive from the Macintosh user community, the better we'll be able to serve.—MARJORIE BAER

Letters

Banking on the Bureau Having seen an ad for the Port Juggler in your magazine, I bought one directly from the company, Momentum of Honolulu.

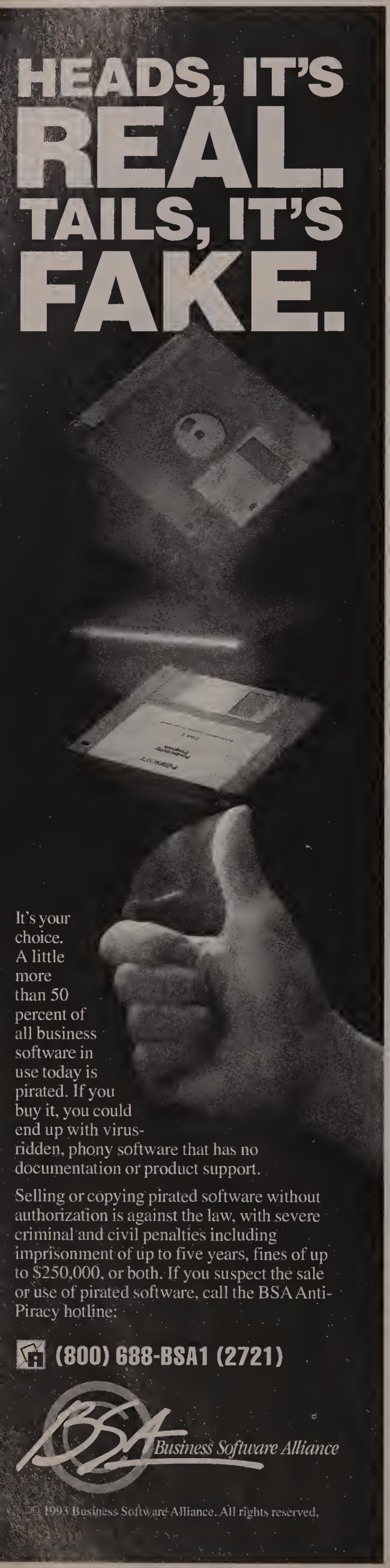
After talking on the phone with a representative for nearly an hour (at my expense) trying to make it work, I was disconnected. So I wrote to the company. They wouldn't return my calls, nor have they answered my letter.

I wrote to the Bank of America because the Port Juggler was billed on our credit card, but the bank has been of no help. I have also written the Better Business Bureau of Hawaii, in Honolulu, but it still appears I have to pay $104 for it. Please let me know if you have any idea how I can make these people make good on their product or refund my money.

Barbara Engstrom
San Simeon, California

Engstrom was a careful consumer—paying with a credit card, keeping copies of her invoice and correspondence with Momentum, and promptly taking

continues



appropriate steps when things went amiss—and her caution paid off. After she wrote to *Conspicuous Consumer*, the Better Business Bureau of Hawaii (808/942-2355) responded. A representative of Momentum contacted Engstrom and arranged a refund.—Suzanne Courteau

Mi problema es . . . James Kemmerer of Washington, D.C., wrote to *Conspicuous Consumer* about a problem he had with mail-order company Big Mac Computers (also known as Westwood Computers), based in Los Angeles. When he purchased a Quadra 660AV from the company last October, Kemmerer was told that the manuals would be in Spanish, but he was assured that Apple Computer would exchange them for English ones. When the computer arrived (with Spanish system software also), Kemmerer called Apple to exchange the manuals. He was told that since Big Mac Computers is not an authorized Apple dealer, Big Mac would be responsible for replacing the manuals itself.

Kemmerer called Big Mac, and a salesperson promised him new manuals and system software in English. After almost two months and numerous unreturned phone calls, he received one of the two promised English manuals. In the meantime, Kemmerer discovered that the CD-ROM drive had been installed improperly, and Apple Computer sent a repair person to his house to fix it.

Kemmerer says that Big Mac Computer owner Jack Sandi agreed in January to let him return the CPU for a refund. But when Kemmerer faxed Sandi a form to sign to ensure the refund, Sandi refused the return, agreeing only to send the system software, which never arrived. Kemmerer could not get his money back through his credit card company because he waited too long to request a charge reversal. At the same time Kemmerer wrote to *Macworld*, he also contacted the Better Business Bureau.

Owner Jack Sandi told *Macworld* Big Mac will not refund Kemmerer's money but has instead offered to send Kemmerer the manuals or give him a $40 credit toward buying them himself. Kemmerer confirms this but says he just wants to return the Mac.

The Los Angeles County Better Business Bureau rates Big Mac Computers as unsatisfactory, in part because of Big Mac's failure to acknowledge two BBB requests for a response to Kemmerer's complaint. Sandi told *Macworld* he is aware of his company's rating and declined to comment further.

Kemmerer's experience illustrates a couple of useful lessons. One is the value of looking into a company's reputation before giving it your business. Call the Better Business Bureau to check out the company's performance rating. Many reputable gray-market companies offer competitive prices and tech support that's comparable to Apple's, but because Apple monitors the operations of Apple-authorized dealerships, buying from them may buy you an extra measure of security when buying Mac equipment.

And though we've said it before, it bears repeating: always pay for purchases with a credit card. The Federal Trade Commission's Fair Credit Billing Act dictates that if you're having a dispute with a company regarding unsatisfactory goods or services, you may be able to get your money back through your credit card company.

If you have complaints about mail-order companies, write to the Division of Enforcement, Federal Trade Commission, Washington, D.C. 20580. The FTC does not resolve individual disputes but may use comments in its law-enforcement efforts.

—Joanna Pearlstein

SERVICE HERO

Bob Workman of Fayetteville, New York, says Andromeda deserves a gold star.

He ordered a Series 2 Photoshop Filter PowerPC upgrade for a Quadra 950 equipped with an Apple Power Macintosh Upgrade Card. But instead of a "fat" filter, which would work in both native–Power Mac mode and in 680X0 mode, Andromeda sent one filter for each mode. Workman often needs to switch between modes, which meant reinstalling the appropriate filter each time he switched.

Workman faxed a note to the company to suggest that it provide fat plug-ins. To his surprise and delight, a few weeks later he received a custom installation disk—keyed to his serial number—with two simultaneously installable filters. Andromeda even assigned the filters separate names in Photoshop's pull-down menu, so Workman can choose the right version to invoke.

"My hat is off to these programmers," Workman says. "They value their customers so much that they're willing to do a little custom programming just to keep one of us happy."

Not getting the treatment you deserve? Or have you received heroic service? Write to the *Conspicuous Consumer* department at *Macworld*, 501 Second St., San Francisco, CA 94107; send us a fax at 415/442-0766; or E-mail us at **macworld@macworld.com**. Look for us on America Online and eWorld (keyword **Macworld**) and on the World Wide Web (**http://www.macworld.com**).

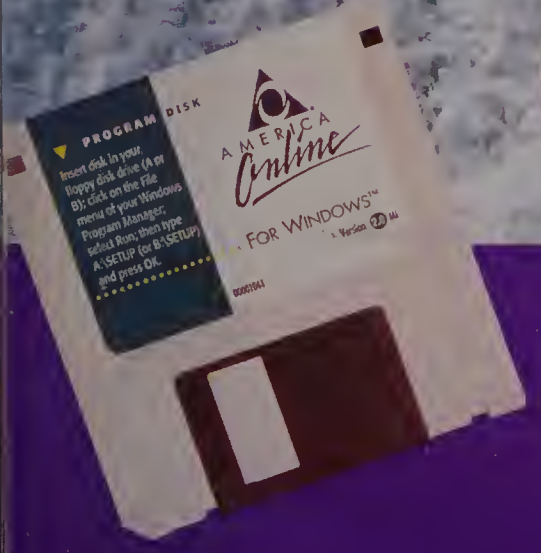
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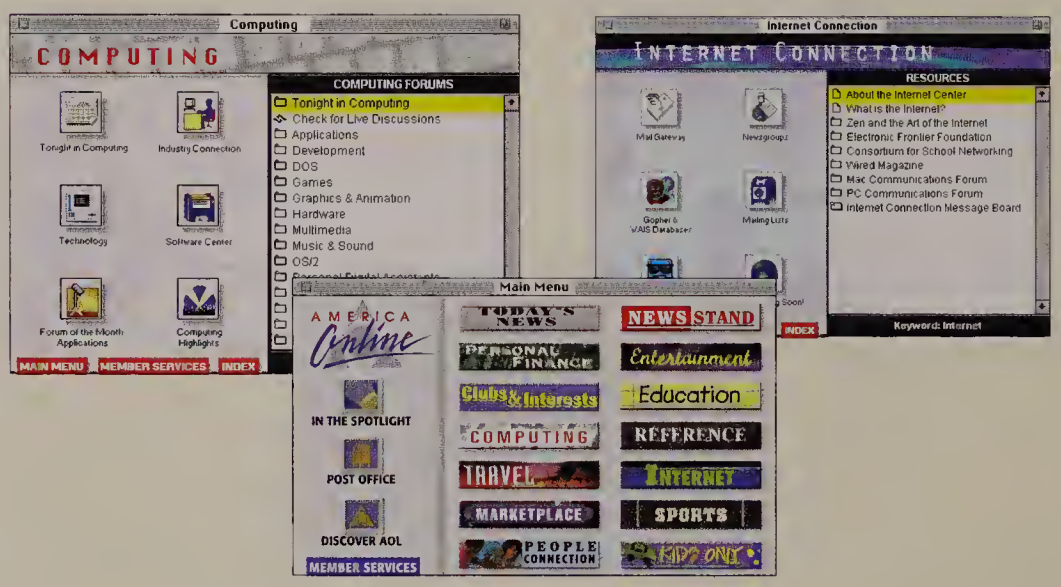
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Editors' Choice

MW EDITORS' CHOICE

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Patricia Carberry-Harris

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in *Macworld*'s comparative articles. A ✣ next to a product indicates that we chose more than one product in that category. A ◀ next to a product listing indicates that a native Power Mac version is available.

Hardware

MONITORS

SMALL COLOR MONITORS, Jan 94

14-inch display: ✣ Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95.
✣ Nanao FlexScan F340i•W; Nanao USA, 800/800-5202; $799.
15-inch display: NEC MultiSync 4FGe; NEC Technologies, 708/860-9500; company's estimated price $755.

TWO-PAGE COLOR MONITORS, Nov 94

PressView 21 Display System; SuperMac Technology, 408/541-6100; $3999.

NETWORK HARDWARE

REMOTE-ACCESS SERVERS, Oct 94

Mixed networks: NetConnect Remote Access Server; Asanté Technologies, 408/435-8401; $3899 for eight ports.
AppleTalk networks: ARA Multiport Server; Apple Computer, 408/996-1010; four ports $1799, eight ports $3298.

PRESENTATION HARDWARE

PORTABLE PRESENTERS, Jan 95

Z115; nView, 804/873-1354; $5495.

PRINTERS

COLOR BUSINESS PRINTERS, Sep 95

Tektronix Phaser 340; Tektronix, 503/682-3411; $5590.

DYE-SUBLIMATION PRINTERS, Jul 94

Prepress proofing—tabloid size/fastest: Phaser 480; Tektronix, 503/682-7377; $14,995.
Prepress proofing—tabloid size/most complete: Rainbow; 3M, 612/733-1110; company's estimated price $20,000.
Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; $7999.
General publishing and business: Phaser IISDX; Tektronix, 503/682-7377; $9995

PERSONAL PRINTERS, Sep 94

Ink-Jet: DeskWriter 520; Hewlett-Packard, 800/752-0900; $365.
Laser—$1000 to $1600: microLaser Pro 600; Texas Instruments, 214/995-6611; $1599.

WORKGROUP PRINTERS, Jun 95

Tabloid-size printers: LaserJet 4MV; Hewlett-Packard, 208/323-2551; $3549.
Legal-size printers: ✣ Optra Lx; Lexmark, 606/232-2000; $3298.
✣ LaserWriter 16/600 PS; Apple Computer, 408/996-1010; company's estimated price $2299.

SCANNERS/IMAGE CAPTURE

PROFESSIONAL REAL-TIME FILMLESS CAMERAS, Sep 95

Fujix DS-515/Nikon E2; Fuji, 914/789-8100; Nikon, 516/547-4200; $12,780; with optional lens and PC Card $14,140.

HIGH-BIT FLATBED COLOR SCANNERS, Mar 95

✣ Arcus II; Agfa, 508/658-5600; $3495.
✣ PowerLook; Umax, 510/651-8883; $3495.

LOW-COST COLOR SCANNERS, Nov 93

$1300 to $1600: ✣ La Cie Silverscanner II; La Cie, 503/520-9000; $1599. ✣ Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; $1599.
Under $1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; $1299.

OCR, Nov 93

OmniPage Professional; Caere Corp., 408/395-7000; $995. ◀

SYSTEMS/STORAGE

1.3GB OPTICAL STORAGE,,Dec 94

Best low-cost solution: 1.3Gig MO; Club Mac, 714/768-8130; $2099.
Best overall performance: Genesis 1300; Microtech, 203/468-6223; $2899.

DOS/WINDOWS CARDS, Sep 95

Most 040 Macs: DOS on Mac; Reply, 408/942-4804; 50MHz model $590; 66MHz model $690.
Most Power Macs: OrangePC Model 220; Orange Micro, 714/779-2772; $1217 direct price.
Occasional Windows Access: Timbuktu; Farallon Computing, 510/814-5100; $199 per user.

HIGH-PERFORMANCE DRIVE SYSTEMS, Jul 95

Accelerator card: SiliconExpress IV; Atto Technology, 716/691-1999; $995.
Drive mechanism: IBM UltraStar series; IBM (available from several resellers), prices vary by reseller.

QUAD-SPEED CD-ROM DRIVES, Jun 95

APS T3501; APS Technologies, 816/483-6100; $299.95.

HIGH-SPEED HARD DRIVES, Aug 93

2.7GB drives: ✣ Nova XL 2700; Microtech, 203/468-6223; $2999. ✣ Vista 3.5GB; Relax, 510/471-6112; $3499.
SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; $499.

RAID STORAGE SYSTEMS, Apr 95

RAID 3 or 5: MR/5 RAID; MegaDrive Systems, 310/247-0006; $18,840.
RAID 0: ✣ Joule RAID; La Cie, 503/520-9000; $2999. ✣ DisKovery 8200W; Optima Technology, 714/476-0515; $7790. ✣ SledgeHammer 2000FMF; FWB, 415/474-8055; $2359.

SYSTEM UPGRADES, Feb 95

Upgrade for Macintosh Quadra 650, 800, or 950: Power Macintosh Upgrade Card; Apple Computer, 408/996-1010; $699.
Upgrade for other 68040 Macs: Replace with Power Macintosh 6100/60 with CPU booster and cache card. Power Macintosh 6100/60; Apple Computer, 408/996-1010; $1819 (base system with 8MB of RAM). PowerClip (CPU booster); Newer Technology, 316/685-4904; $245. 256K cache card; various companies, roughly $200.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94

Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; $599.
Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; $4499.

DIGITAL-VIDEO BOARDS, Aug 95

SpigotPower AV; Radius, 408/434-1010; $999.

HIGH-END VIDEO EDITING, Jun 94

Presentation video: ✣ MoviePak2 Pro Suite; RasterOps, 801/785-5750; $4199. ✣ VideoVision Studio; Radius, 408/434-1010; $4499.
Corporate video (offline): Media Composer 400s; Avid

continues

MACWORLD Editors' Choice

Technology, 508/640-6789; $14,995.
Corporate video (online): VideoCube; ImMix, 916/272-9800; $40,500.

PHOTOSHOP ACCELERATORS, Apr 94
PhotoBooster; Radius, 408/434-1010; $999.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Best Ware, 201/586-2200; $199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

PORTABLE-DOCUMENT SOFTWARE, Apr 95
Document Distribution: Common Ground 1.1; No Hands Software, 415/802-5800; $189.95.

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $595.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

COMMUNICATIONS/NETWORKS

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: ZTerm; David P. Alverson (no phone number available); $30.
Terminal emulation: Crosstalk for Macintosh; Digital Communications Associates, 404/442-4000; $195.
Internet exploration: VersaTerm; Synergy Software, 215/779-0522; $125.

DOS WINDOWS EMULATION, Oct 94
Timbuktu Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Farallon Computing, 510/814-5000; $199 each.

NETWARE CONNECTIVITY, Sep 93
NetWare for Macintosh; Novell, 801/429-7000; $495 for 5-user license, to $2295 for 200-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek; AG Group, 510/937-7900; $795.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

3-D MODELING, Dec 94
Stand-alone modeler: formZ; autodessys, 614/488-9777; $1495.
Integrated-modeling package: Strata StudioPro; Strata, 801/628-5218; $1495.
Entry-level modeler: Infini-D; Specular International, 413/253-3100; $695.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ✣ ClickArt Studio Series; T/Maker Company, 415/962-0195; $99.95 per volume.
✣ Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; $67.50 per month.
✣ Images with Impact series; 3G Graphics, 800/456-0234; $99.95 to $129.95 per volume, CD-ROM $499.
✣ Metro ImageBase Electronic Clip Art; Metro ImageBase, 800/525-1552; $74.95 per volume, CD-ROM $149.95.
✣ Typographers' Ornaments; Underground Grammarian, 609/589-6477; $25 per volume; ten TIFF albums $200; EPS volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.
Beginners' program: Aldus SuperPaint; Aldus Consumer Division, 619/558-6000; $149.95.
Overall: Canvas; Deneba Software, 305/596-5644; $399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400; $99 (this price includes the ability to unlock two families from preselected packages); an additional $25 enables you to unlock individual faces, or $69 to $179 for unlocking families.
Display/decorative-face collection: Fontek; Letraset, 201/845-6100; $39.95 per face.
Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; $89 for 57 fonts.

IMAGE DATABASES, Oct 93
✣ Aldus Fetch 1.0; Adobe Systems, 206/628-5739; $295.
✣ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $249.

IMAGE EDITORS, Feb 95
Adobe Photoshop 3.0; Adobe Systems, 415/961-4400; $895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris Corp., 408/727-8227; $299.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online, 703/893-6288; basic monthly fee $9.95..
Reference: CompuServe; CompuServe Information Service, 614/457-0802; basic monthly fee $8.95.

Vendors: Please write to *Macworld Editors' Choice*, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

ORGANIZATION/PRODUCTIVITY

GRAPHING SOFTWARE, Aug 94
DeltaGraph Pro 3 3.0.4; DeltaPoint, 408/648-4000; $195.

SALES-AUTOMATION SOFTWARE, Oct 93
✣ Contact Ease; WestWare, 619/274-5053; one user $395, five users $1495.
✣ CBS; Colleague Business Software, 512/345-9964; $495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; $129.
Multiuser system: Personal Librarian; Personal Library Software, 301/990-1155; $995.

PRESENTATION TOOLS

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Adobe Systems, 206/622-5500; $495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; $189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; $84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149.

VIRUS KILLERS, Jul 94
Commercial software: Virex; Datawatch, 919/549-0711; $99.95.
Free software: Disinfectant; free from various online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99.

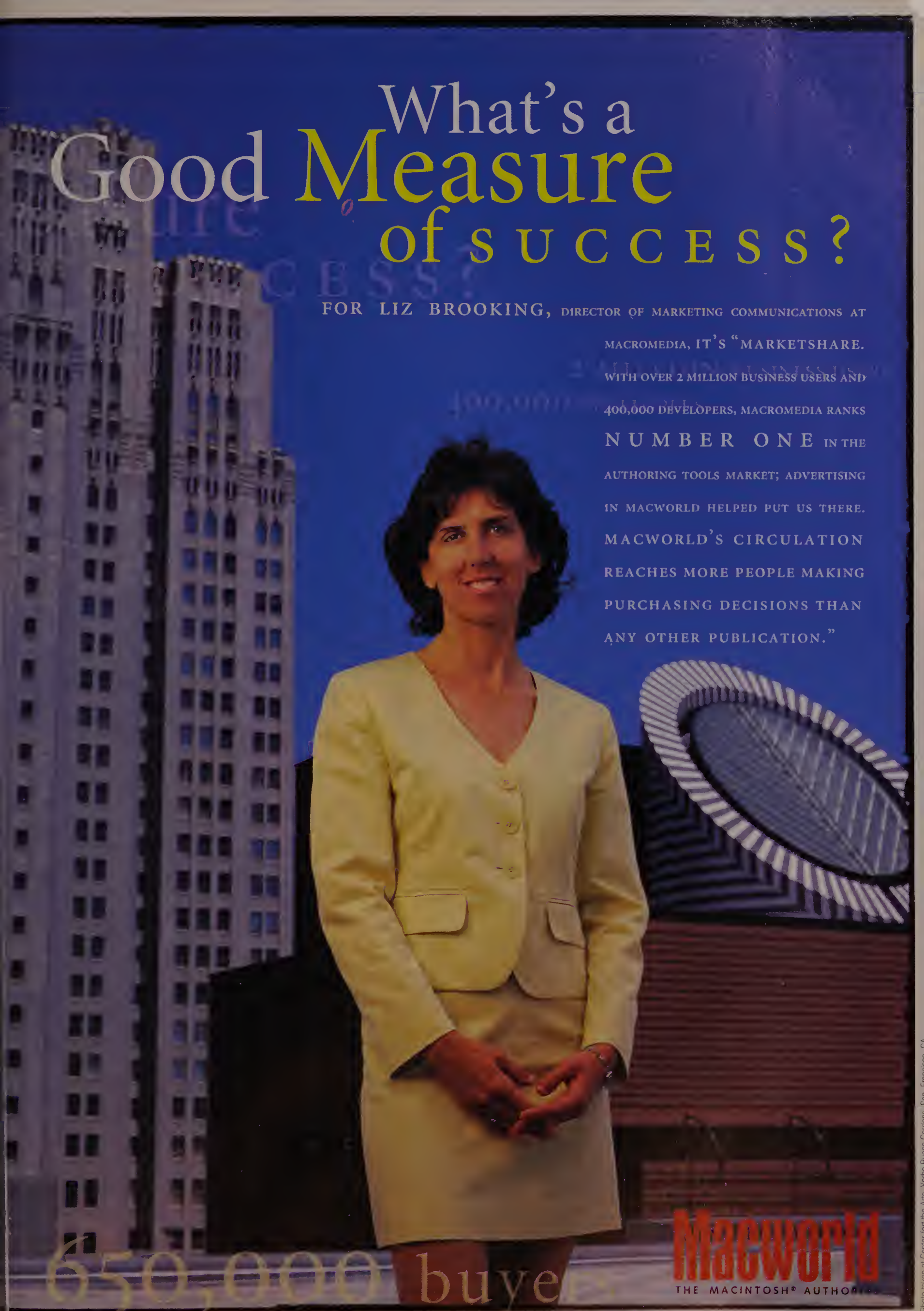
WORD PROCESSORS

HIGH-END WORD PROCESSOR (for fast 68040 Macs and Power Macs), Mar 95
Microsoft Word 6.0; Microsoft Corp., 206/882-8080; $325.

LOW-COST WORD PROCESSOR, Mar 95
MacWrite Pro; Claris Corp., 408/727-8227; $99.

What's a Good Measure of SUCCESS?

FOR LIZ BROOKING, DIRECTOR OF MARKETING COMMUNICATIONS AT MACROMEDIA, IT'S "MARKETSHARE. WITH OVER 2 MILLION BUSINESS USERS AND 400,000 DEVELOPERS, MACROMEDIA RANKS NUMBER ONE IN THE AUTHORING TOOLS MARKET; ADVERTISING IN MACWORLD HELPED PUT US THERE. MACWORLD'S CIRCULATION REACHES MORE PEOPLE MAKING PURCHASING DECISIONS THAN ANY OTHER PUBLICATION."



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Star Ratings

HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

Macworld Star Ratings lets you compare Macintosh products by providing summaries of *Macworld*'s authoritative product reviews from the past year. The number of stars indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The ◀ symbol indicates that a product is available in a native Power Mac version.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS TOOLS

★★★ **AccuZip6 1.8.7, Software Publishers, 800/233-0555, $689.** Bulk-mail software has informative progress indicators, batch and individual processing, low rates, and flexible parsing during import, but the interface is incomprehensible. Sep 94

★★ **Adobe Acrobat 2.0, Adobe Systems, 415/961-4400, $195.** The font fidelity of this portable-document software is uneven, and the software demands too much in resources compared with other options. Mar 95

★★★ **Adobe Acrobat for Workgroups 2.0, Adobe Systems, 415/961-4400, $1595.** As a collaboration tool, this software is inexpensive and offers well-done annotation tools. However, it's resource-intensive, and creating hypertext documents with it isn't easy. Mar 95

★★★★ **BizPlan Builder 5.0, Jian, 415/254-5600, $129.** To create a comprehensive business plan, just fill in the blanks in this easy-to-use spreadsheet/word processor template. Jun 95

★★ **Bulk Mailer CASS 1.00d (1.3), Satori Software, 206/443-0765, $150.** Unattended operation is possible with this bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94

★★★ **Business Plan Writer 6.0, Graphite Software, 301/984-1100, $99.** This proposal-writing template can help entrepreneurs create a detailed business plan, but—unlike the competition—it won't help them format an attractive presentation. Jun 95

★★★ **CA-Cricket Graph III 1.52 (1.53), Computer Associates International, 516/342-5224, $129.** Graphing software's features are just right for charts in the physical and social sciences, but lack pizzazz. The program is easy to learn and use, and includes math features for data transformations and curve fitting. Dec 94 ◀

★★★★ **ClarisWorks 3.0, Claris Corp., 408/727-8227, $129.** Inexpensive, easy to use, and powerful integrated software is the best package available. It's far better in terms of features, speed, integration, and use of system resources than its competition. Feb 95 ◀

★★★★ **Crystal Ball 3.0 (3.0.1), Decisioneering, 303/449-5177, $295.** Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster-avoidance in a variety of business tasks. Oct 94

★★★★ **Decision Analysis 2.5, TreeAge, 617/536-2128, $379.** Decision-assistance software handles complex business cases by constructing tree diagrams of probabilities and payoffs. It offers a type of modeling that is easy to modify. Nov 94 ◀

★★★ **Extend+BPR 3.0 (3.1), Imagine That, 408/365-0305, $990.** Business-modeling software includes superior templates for business-process reengineering, but some programming experience is helpful. Oct 94

★★★ **InfoDepot 2.0 (2.3), Chena Software, 610/770-1210, $295.** Project-planning program includes tools for brainstorming and organizing ideas; scheduling project steps; and entering, calculating, and presenting data. It does a good job but has some flaws. Jan 95

★★★★ **MarcoPolo 3.0, Mainstay, 805/484-9400, $895.** Full-featured document-management system is significantly improved. The addition of OCR—both the handling of unrecognized words and the ability to batch-process TIFF files with OCR—make it very usable. Jan 95

★★★ **MicMac 2.0v1, Nirvana Research, 408/369-1200, $89.** The concept of Mac as dictation machine is attractive, and Nirvana has pulled it off well. It takes lots of hard drive space to save recordings, though. Nov 94

★★★★ **Microsoft Excel 5.0, Microsoft Corp., 206/882-8080, $339.** Although the feature set of this Power Mac spreadsheet is stunningly rich, the system requirements for a full install are jaw-dropping, including 27MB of hard drive space plus 24MB of RAM without virtual memory. Still, it is relentlessly complete. Jan 95 ◀

★★★ **Microsoft Works 4.0, Microsoft Corp., 206/882-8080, $99.95.** Although this isn't the best integrated package around, it's a sensible, low-cost choice. It offers a respectable word processor, database, spreadsheet, calendar, and address book, as,well as a slide-show module, and drawing and communications tools. Jan 95 ◀

★★★★ **OmniPage Professional 5.0, Caere Corp., 408/395-7000, $695.** In a historic first for OCR, this Power Mac software has an accuracy of 100 percent on good text samples. It does still make occasional baffling minor errors on real-world documents. Nov 94 ◀

★★★ **Phyla 1.0.3, Mainstay, 805/484-9400, $495.** While nonprogrammers can learn to use this object-oriented database, a little SmallTalk or C++ programming background wouldn't hurt. Aug 95

★★★ **Street Atlas USA 2.0, DeLorme Mapping, 207/865-1234, $79.** For the most part, this geographical information software delivers what it promises at a great price. Oct 94

★★★ **TeamFlow 3.1, CFM, 617/275-5258, $295.** Total Quality Management flowchart software is a valuable business tool. Its report printing and customizability are limited, however. Nov 94

★★★★ **ZipZapp 1.0 (2.0), True Basic, 603/298-8517, $34.** You can use this data-reference utility to find an area code, the correct spelling of a city's name, and more. The interface is intuitive, and the cost, low. Oct 94 ◀

★★★ **ZP4 12.1 (14.4), Semaphore Corp., 408/688-9200, $125.** Inexpensive bulk-mail software supports batch and individual processing, but the progress indicators are uninformative. Sep 94

COMMUNICATIONS/NETWORKS

★ **BLAST Professional, BLAST Inc., 919/542-3007, $139.** Our reviewer could not get this telecom software to work reliably and consistently during his tests, and found the minimalist and quirky interface frustrating. Jan 95

★★★ **CreativePartner, emotion Inc., 415/812-9000, $1500.** Creative collaboration goes digital with this distribution system for video, sound, text, and graphics. Although the system provides a clever way to send annotations over a network, our reviewer wished for either a higher number of features or a lower price tag. Jul 95

★★★★ **FileWave 2.1.2, Wave Research, 510/704-3900, $895.** Maintain a central repository of files and distribute application updates to LAN users with this easy-to-use software-distribution tool. Excellent features include file distribution during idle time and the ability to copy-protect transferred files. Jul 95

★★ **HoloGate 1.0, Information Access Technologies, 510/704-0160, $500.** Two unique features—UUCP and Usenet news distribution—are the primary reasons to consider this product. Otherwise, it comes up price-rich and feature-poor. Apr 95

★★ **The Internet Companion, The Voyager Company, 914/591-5500, $29.95.** Well-written, HyperCard-based electronic book offers less information than others. Internet access is available through accompanying software, but it's a terminal-emulation screen. Dec 94

★★★★ **Internet Explorer Kit and Internet Starter Kit, Hayden Books, 317/581-3500, $29.95 each.** Well-written books and useful software combine to produce one of the best introductions to the Internet available for Mac users. Dec 94

★★★★ **Internet Membership Kit 1.0 (2.0), Ventana Media, 919/942-0220, $69.95.** If you need access to the Internet, this book and software combination is a good package. The best part about it is its includ-

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Star Ratings

ed preconfigured software. Dec 94

★★★ **MicroPhone Pro 2.0 (2.1), Software Ventures Corp., 510/644-3232, $195.** The new feature set of this communications package includes multiple sessions, faxing, and more, but it's a mixed bag. Oct 94

★★★★ **Netscape Navigator, Netscape Communications Corporation, 415/528-2555, $39.** World Wide Web browser is well ahead of the competition in terms of features, stability, and ease of use. Although its E-mail features could use some improvement, it's the best way to surf the Net. May 95

★★★★ **NetWorks 3.0.4, Caravelle Networks Corp., 613/225-1172, $1395 to $2495.** For networks that sprawl across buildings or states, this network-monitoring utility is an indispensable tool. It continually polls devices, checking CPUs, routers, printers, and hubs for signs of life. Apr 95

★★★★ **ProTerm Mac 1.0, InTrec Software, 602/992-5515, $129.95.** This communications program offers a level of sophistication that belies its small size and ease of use. It's fast, reliable, and stable, and is suitable for simple BBS connections or sophisticated scripting. Jul 95

★★★ **QuickMail 3.0, CE Software, 515/221-1801, $199 to $3799.** If you're shopping for a first-time E-mail application, this product is a good choice for ease of use and setup. The most promising new tool, rules-based messaging, lacks some important features. Jan 95

★★★ **RunShare, Run, Inc., 201/529-4600, $199 to $2499.** System extension endeavors to pump up file-transfer speeds across networks. It offers twofold to threefold throughput gains for fast Macs and large files but is less useful with small files or slow Macs. Feb 95

★★★ **Saber LAN Workstation, Saber Software, 214/361-8086, $199 plus $49 per node.** LAN-management package includes programs for network administration and remote software updating. Although it lacks some of the niceties of network-management software for other platforms, it's a useful tool for the price. Aug 95

★★★★ **Snatcher 1.0, Software Ventures, 510/644-3232, $49.95.** Simple, efficient FTP tool lets you connect to multiple sites simultaneously, transfer several files at once, and create scripts to automate repetitive tasks. Happily, you can continue to browse while downloading files. Aug 95

★★★★ **White Knight 12.0, The FreeSoft Company, 412/846-2700, $139.** While this telecom software can be bewildering, it works impressively well. If you're willing to read the manual from cover to cover, the program may become your favorite telecom tool. Nov 94

DESKTOP PUBLISHING

★★ **CheckPost 1.3, Working Software, 408/423-5696, $89.95.** Interface aside, this imagesetter-simulation software is generally disappointing. It can't automatically scale pages, it prints on a single sheet, and its error reporting is limited. Nov 94

★★★ **ClickBook 1.1 (1.2), BookMaker Corp., 415/354-8161, $69.95.** If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. Nov 94

★★★ **Download Mechanic 1.0.2 (1.5), Acquired Knowledge, 619/587-4668, $249.** The strengths of this PostScript downloader lie in its tools for dealing with problem files, but when dealing with large files, it performs slowly and occasionally crashes. Feb 95

★★★★ **FontChameleon 1.0.1 (1.5), Ares Software Corp., 415/578-9090, $295.** New font-creation technology builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus the ability to customize fonts. Sep 94

★★★ **FontMixer 1.0, Monotype Typography, 312/855-1440, $79.** Although a tad expensive, this font utility is a straightforward way to mix characters from different fonts to create composite fonts. Oct 94

★★★★ **Fontographer 4.0.4 (4.1), Macromedia, 415/252-2000, $495.** No other font editor does more or works better than this one. For the price of a few font families, it can give you a universe of unique faces. Oct 94

★★★★ **LaserCheck 1.0, Systems of Merritt, 334/660-1240, $199.** Imagesetter-simulation software can save you hundreds of dollars, and many hours, on imagesetting jobs by letting you use a laser printer to proof your work. Nov 94

★★★★ **Let'er RIP 2.0 (2.0.1), Lupin Software, 916/756-7267, $239.** The flexibility, clean implementation, and attention to detail of this PostScript downloader make it a pleasure to use. Feb 95

★★★★ **PageTools 1.0, Extensis Corp., 503/274-2020, $129.** Collection of ten PageMaker Additions is packed with utility. Many users will find the PageAlign, PagePrinter, and PageRulers Additions alone worth the price, and the others frosting on the cake. Dec 94

★★★ **ReadySetGo 6.0.2, Manhattan Graphics Corp., 914/725-2048, $395.** There's no strong reason not to use this destop publishing software if its tools meet your needs, but there's no compelling reason to choose it, either. Its low price is nice, but not enough. Oct 94

★★★★ **theTypeBook 4.0, Rascal Software, 805/255-6823, $59.95.** The manual needs work, but this type-specimen generator provides enough customization options to make it a worthwhile purchase. Jun 95

EDUCATION/ENTERTAINMENT

★★★★ **3D Atlas 1.1, EA World, 415/571-7171, $79.95.** Well-designed atlas enriches map data with narration, photos, and QuickTime movies. May 95

★★★★★ **A.D.A.M. The Inside Story, A.D.A.M. Software, 404/980-0888, $79.95.** Multimedia anatomy CD-ROM teaches basic anatomy and physiology with a tantalizing mix of sound, graphics, and animation. If you are the least bit interested in learning more about how the human body works, buy this program. Mar 95

★★★ **Aquazone 1.0, Inago, 416/487-4005, $59.** The fish in this aquarium simulation are beautiful, but they're darned hard to keep alive. Only two varieties of fish are included. Jan 95

★★★ **Creative Writer 1.0, Microsoft Corp., 206/882-8080, $49.95.** Graphics/page-layout/word-processor hybrid offers some terrific type effects, zany sounds, and bright graphics. Sep 94

★★★★ **Crossword Wizard 1.0, Cogix Corp., 415/454-7217, $49.95.** If you're a crossword fan, this crossword-puzzle generator is a must. Although it's not perfect, the play mechanics are fantastic. Dec 94

★★★ **CyberBoogie, Times Mirror Multimedia, 314/531-2503, $49.95.** The easy interface, bouncy songs, and cute graphics of this children's animation software make it a good choice for very young kids, but its relative lack of features restricts it to the same group. Apr 95

★★★ **Digital Chisel 1.2, Pierian Spring Software, 503/222-2044, $199.95, site license $995.** If I had a Chisel, I'd Chisel out some quizzes; I'd say how easy this is—no I wouldn't. Ahem. What I mean is: this authoring tool lets educators create interactive quizzes, but suffers from a nonstandard interface. Jun 95

★★★ **Kids World, Bit Jugglers, 415/968-3908, $30.** Although the painting tools could be more robust, this screen-saver-creation tool for kids is easy to use, cleverly designed, and can keep kids busy for hours. Mar 95

★★★★ **Material World, StarPress Multimedia, 415/274-8383, $59.95.** This multimedia CD-ROM provides a fascinating look at diverse cultures from around the world by documenting the lives of average families. Jun 95

★★★★ **Math Workshop, Brøderbund Software, 415/382-4700, $40.** Youngsters can have some fun while learning math with this collection of math-related and problem-solving games. Six-to-nine-year-olds will enjoy activities like Rhythm Shop and Bowling for Numbers. Aug 95

★★★ **Small Blue Planet 2.0 (2.0.1), Now What? Software, 415/885-1689, $59.95.** The satellite photos of this atlas are truly dazzling, although the interface is less than world class. May 95

★★★★ **Storybook Weaver Deluxe 1.0, MECC, 612/569-1500, $69.95.** Hooray for applications that encourage kids to be creative! This one lets them combine pictures, sounds, and words to make their own storybooks. May 95

★★★★ **Theorist 2.0, Waterloo Maple Software, 519/747-2373, $299.** Despite an occasionally odd interface (for example, a hammer icon), this symbolic-math program is a great learning aid for students. Jun 95

★★★★ **WarPlanes 1.0, Maris Software, 800/336-0185, $69.** Wonderful multimedia CD-ROM tours the post-WWII era in military aviation. As well as pictures and text, it includes rotatable models of aircraft, an extensive database, and three flight simulators. Mar 95

★★★★ **Widget Workshop, Maxis Software, 510/254-9700, $44.95.** Fiendishly clever mad scientist's laboratory allows you to build widgets out of metronomes, switches, light bulbs, and much more. It encourages imagination and exploration, plus kids think it's cool. Apr 95

FINANCE/ACCOUNTING

★★★★ **M.Y.O.B. 5.0, BestWare, 201/586-2200, $139; $239 w/payroll.** A well-designed interface makes double-entry accounting easy enough for anyone to do. And—for those small-business owners who are keeping an eye on the bottom line—the price is right. May 95

★★★ **QuickBooks 3.0, Intuit, 415/322-0573, $119.** Full-featured double-entry accounting program is easy to use, but its operation is not entirely Mac-like and its cryptic error messages may cause you to ignore serious problems. Jun 95

★★★★ **Quicken 5.0, Intuit, 415/322-0573, $49.95.** A calendar and new ease-of-use features keep this personal finance software comfortably ahead of the pack. This upgrade is an incremental, but still welcome, improvement over an already excellent product. Feb 95

★★★ **StreetSmart 1.0, Charles Schwab & Company, 800/334-4455, $59.** If Schwab is where you want your investments held, and if you want tighter control over your portfolio and to save on brokerage fees, you should consider this financial investment software. Feb 95

GRAPHICS

★★★★ **Adobe Dimensions 2.0, Adobe Systems, 415/961-4400, $199.** 3-D effects software has added color support, as well as drawing and text tools. Its ability to create resolution-independent 3-D images and map

continues



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two-dimensional art earn Dimensions a place on a designer's hard drive. Apr 95

★★★★ **Adobe Illustrator 5.5, Adobe Systems, 415/961-4400, $595.** Despite slight speed disappointments, this draw program's upgrade is a bargain. It offers improved text-formatting and trapping capabilities. Sep 94

★★★★ **Adobe Photoshop 3.0, Adobe Systems, 415/961-4400, $895.** Image-editing program both broadens its capabilities and simplifies its work environment in this dynamic upgrade. While not perfect, the pros far outweigh the cons. Jan 95

★★★ **Alien Skin Textureshop 1.0, Virtus, 919/467-9700, $99.** Apply mutations to master textures to create custom patterns made up of seamless tiles. Control freaks won't like this program's random mutations, but it provides a simple way to create patterns. Jul 95

★★ **Art Explorer 1.0, Aldus Consumer Division, 206/628-2749, $49.95.** While its cartoon style is refreshing and its features promising, this paint/draw program for kids is still rough around the edges. Its biggest limitation is that it's unusably slow on 68030 Macs. Feb 95

★★★★ **Blueprint 5.0, Graphsoft, 410/290-5114, $295.** For plain old 2-D drafting, this CAD software has a rich, easy-to-use feature set and is admirably fast. The Power Mac version in particular is a first choice for large architectural or engineering diagrams. Jan 95

★★★ **CD-Q 2.0, Human Software Company, 408/741-5101, $145.** Take advantage of Kodak's YCC format for Photo CD with this Photoshop plug-in, which lets you make color corrections and fine-tune color separations. If you frequently use Photo CD for image processing, this is the way to go—if you don't mind an inelegant interface and perfunctory documentation. Jul 95

★★★ **ClarisDraw 1.0 (1.0v2), Claris Corp., 408/727-8227, $399.** For presentations without grand artistic pretensions, this draw program can be an effective tool. Considering the wobbliness of some of its features, however, $400 may be too much to pay. Jan 95

★★★★ **Color It 3.0, MicroFrontier, 515/270-8109, $149.95.** Don't turn Old Paint out to pasture yet. This venerable paint program has been updated with a number of powerful new features, including precise control over pressure-sensitive input, convolution functions, and a focus filter. A great program for beginners. Aug 95

★★★ **Dabbler 1.0, Fractal Design Corp., 408/688-5300, $99.** Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface, at a great price. Nov 94

★★★★ **ElectricImage Animation System 2.0 (2.1), Electric Image, 818/577-1627, $7495.** Although the price may seem incredibly high, this software, with its extraordinary animation and image-rendering capabilities, is worth every penny for cinematic-production professionals. Dec 94

★★★ **Flying Colors, Davidson & Associates, 310/793-0600, $59.95.** While not the most dynamic kids' program, this paint/draw program provides easy-to-use tools and nicely drawn stamps for ages eight to adult. Feb 95

★★★★★ **Fractal Design Painter 3 (3.1), Fractal Design Corp., 408/688-8800, $499.** Image-creation program has achieved a rare state of perfection, balancing enhanced conventional controls with spectacular effects packaged inside a tidy interface. It offers a new level of usability and genuine practicality. Apr 95

☆★★ **FullPixelSearch 1.5, Avian Systems, 201/224-2025, $1295.** Analyze scientific images with a variety of pixel-selection functions. It's a useful tool for scientists, but could use batch processing, scripting, the ability to handle 12- and 16-bit images, and a heftier manual. Jul 95

★★★ **Gryphon Batch It 1.0, Gryphon Software, 619/536-8815, $199.** Arranges tiles in a visual interface to automate repetitive graphics operations. Although it lacks conditional statements, this batch processor is a time-saver. Jun 95

★★★★ **IntelliDraw 2.0 (2.0.1), Adobe Systems, 415/961-4400, $99.99.** Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Sep 94

★★★★ **KPT Bryce 1.0 (1.1), HSC Software, 805/566-6200, $199.** For less than $200, you get a remarkable 3-D landscape-rendering program, a CD-ROM of images, a slide-show utility, and some screen-saver modules. Although the innovative, graphics-heavy interface can be confusing, this software is lots of fun. Dec 94

★★★★ **KPT Convolver 1.0, HSC Software, 805/566-6200, $199.** Create your own Photoshop filters the intuitive way with this imaginative and absorbing plug-in module. The interface allows you to experiment, combining effects, tweaking results, and applying multiple undos if necessary. Aug 95

★★★★ **LogoMotion 1.0 (1.5), Specular International, 413/253-3100, $149.** Easy-to-use 3-D package is eminently affordable. It's a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94

★★★★ **MacDraft 4.0, Innovative Data Design, 510/680-6818, $449.** Report-links to Excel and a clean interface make this 2-D CAD software an excellent choice for use in mechanical engineering and construction. Plus, it's easy to learn. Mar 95

★★★★ **MacPhase 2.0, The Otter Solution, 315/768-3956, $279.** This speedy, feature-rich program offers the full spectrum of standard scientific and graphics image processing tools. Note that it's aimed at technical users, not dabblers. Aug 95

★★★★ **Macromedia FreeHand 5.0, Macromedia, 415/252-2000, $595.** The new version of this venerable program has not only kept pace with the competition but has also added unique features of its own. Although the interface is more cluttered than ever, the wealth of new capabilities make this the drawing program to buy. May 95

★★★★ **MiniCad 5, Graphsoft, 410/290-5114, $795.** Excellent CAD software for the Power Mac offers major performance for its price. It's admirably easy to learn. Nov 94

★★★ **MovieFlo' 1.1, The Valis Group, 415/435-5404, $899.** Tug, twist, and pinch your sister—or at least a digital image of her—with this special-effects program for stills or QuickTime movies. Well-designed application is hampered by a steep price and a poor manual. Jun 95

★★★★ **PhotoEnhancer 1.0, PictureWorks, 510/855-2001, $129.** Nifty utility provides dozens of ways to improve the quality of QuickTake photos, from sharpening or softening focus to correcting over- or underexposed shots. Apr 95

★★★ **PhotoFlash 2.0, Apple Computer, 408/996-1010, $129.** If you want to enhance or catalog images acquired from a scanner or a digital camera such as Apple's QuickTake 100, consider this utility. It's not a high-end image-editing program, but it does offer basic image-retouching tools at a reasonable price. Jul 95

★★★ **PhotoMatic 1.01 (2.0), DayStar Digital, 404/967-2077, $199.** AppleScript-based utility lets you automate tasks in Adobe Photoshop 2.5.1 or later. Although it's limited, it can relieve you of some mundane chores. Nov 94

★★★★ **Pixar Typestry 2.1, Pixar, 510/236-4000, $299.** With QuickDraw GX support, an approachable interface, a strong array of animation features, and outstanding image quality, this 3-D type-effects software is worth a try. It adds a new dimension to the way you look at type. Feb 95

★★★★ **PixelPaint Pro 3.01, Pixel Resources, 404/449-4947, $379.** Color paint program strikes a good balance between the artistic demands of painting and the technical precision of image processing. Mar 95

★★★ **PixelPutty Solo (1.5), The Valis Group, 415/435-5404, $399.** Affordable modeler lets you manipulate 3-D objects as if they were clay. It's a capable program, but a bare-bones interface and skimpy manual make it somewhat daunting for novices. Jun 95

★★★ **Ray Dream Designer 3.1.1, Ray Dream, 415/960-0768, $349.** 3-D graphics program provides competent (if sometimes awkward) modeling tools, offers excellent surface-texturing capabilities, and produces high-quality ray-traced renderings. Mar 95

★★★ **ScanPrepPro 1.2 (2.0), ImageXpress, 404/564-9924, $695.** Adobe Photoshop add-on automates the scanning and image-massaging process and produces good results, although the program is somewhat unstable. Nov 94

★★ **Select 1.6, Human Software Company, 408/741-5101, $245.** Although its selection mode provides a convenient and intuitive way to make changes to several colors at once, all the features of this CMYK color-correction plug-in can be found in Photoshop. Jul 95

★★★ **Specular Collage 2.0.1, Specular International, 413/253-3100, $399.** Practical image-compositing solution supplies a smooth interface and strong support for Adobe Photoshop 3.0. As long as you're willing to return to Photoshop to confirm your edits and make final changes, it's a serviceable tool. Feb 95

★★★ **Terrazzo 1.0, Xaos Tools, 415/487-7000, $199.** Turning a random group of pixels into a geometric pattern may not be everyone's consuming passion, but this plug-in graphic-effects module has definite appeal for a select niche of fabric, graphic, and video designers. Nov 94

★★★★ **TextureScape 1.5, Specular International, 413/253-3100, $195.** Algorithmic art program lets you manipulate and arrange PostScript shapes to create seamlessly repeating patterns. Like the best tools, it's simple enough to be fun and flexible enough to give you meaningful control. Feb 95

★★★★ **TypeTwister 1.0, Adobe Systems, 415/961-4400, $29.99.** Inexpensive, easy-to-use, and fun type styler lets you create wildly styled text effects, although it won't satisfy hard-core type manipulators. Jan 95

★★★ **Virtus WalkThrough Pro 2.0, Virtus Corp., 919/467-9700, $495.** Aside from occasional stumbles, this design tool is an exceptional program that lets you quickly and intuitively interact with your designs and gives clients the opportunity to visit and explore your creations before they are built. Apr 95

★★★★ **Vision 3d 4.0, Strata, 801/628-5218, $695.** 3-D modeling, rendering, and animation package expands its array of modeling tools and adds two renderers. Plug-in extensions provide a practical way to customize the program, while easy-to-read documentation makes learning its many features relatively painless. Jul 95

★★★ **Vistapro 3.0, Virtual Reality Laboratories, 805/545-8515, $149.95.** 3-D landscape rendering software uses digital versions of U. S. Geological Survey maps to create images and allows you to add external features such as buildings and rivers. Although it's a good program, it has some limitations. Feb 95

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Star Ratings

★★ **xRes 1.11, Fauve Software, 415/543-7178, $799.** You can apply a variety of effects to selected areas of a large composition with this image editor. Although it offers pluses such as useful filters and customizable gradients, this program's numerous interface oddities make it less attractive than the competition. Jul 95

MATH/SCIENCE

★★★★ **Chamber Works 1.0.2 (1.1), OnScreen Science, 617/776-6416, $99.** Simulator for particle-physics events is the best introduction to particle physics yet produced, at a great price. Dec 94

★★★★ **JMP 3.0 (3.1), SAS Institute, 919/677-8000, $695.** This statistics software can be used for a wide range of biological, chemical, and physical-science investigations. Sep 94

★★★ **Kekulé 1.1, PSI International, 410/821-5980, $495.** Science software reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. Nov 94

★★★ **Maple V 3.0, Waterloo Maple Software, 519/747-2373, $795.** If you prefer to do your own programming and function creation, you'll benefit from this symbolic mathematics software's efficient use of your Mac's resources. This version hits most of the points on your symbolic-math wish list. Oct 94

★★★★ **MATLAB 4.1 (4.2c), The Math Works, 508/653-1415, $1695.** Relatively expensive numerical math software has added nearly 100 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. Its toolboxes make it a first choice for many applied-science specialties. Nov 94

★★★★ **MLab, Civilized Software, 301/652-4714, $1495.** Mathematical-modeling software lets you do fast computation on numerically complex real-world problems, using an ancient Mac II or higher. You must be willing to write short programs, but professional researchers will find it a rewarding choice. Apr 95

★★★★ **Spyglass Plot 1.0 (1.01), Spyglass, 217/355-6000, $295.** This scientific-charting software is the first choice for serious large-set plot crunching. Oct 94

★★★★ **Statistica/Mac 4.1, Stat5oft, 918/583-4149, $695.** At present, this statistical software is the undisputed features-per-dollar champion in the Mac market. Mar 95

★★★★ **Super5cope II 1.25 (1.4), GW Instruments, 617/625-4096, $1490.** Despite a relatively small instrument library, this laboratory data-acquisition software effectively covers a wide range of needs. Oct 94

★★★★ **Survival Tools 1.0 (1.1), Abacus Concepts, 510/540-1949, $295.** The combination of survival analysis with the StatView template systems gives you a virtual actuary-in-a-box. It's a great set of tools, conveniently packaged. Feb 95

ORGANIZATION/PRODUCTIVITY

★★★ **ACT 2.0, Symantec Corp., 503/334-6054, $249.95.** Contact manager's file-level compatibility with DOS and Windows and its complete contact management make it worth considering if you can live with its weak scheduling functions. Mar 95

★★★★ **Arrange 2.0, Common Knowledge, 415/325-9900, $349.** If your needs fall beyond the usual calendar and address-book functions, this personal information manager is a strong contender. It now has more calendar functions and print options. Dec 94

★★★ **Claris Organizer 1.0 (1.0v2), Claris Corp., 408/727-8227, $99.** New personal information manager users, lured by the low price, good performance, and ease of use of this product, will find that it meets their needs. Most longtime PIM users won't be tempted to switch. Jan 95

★★ **ClienTrac 2.0, Whiskey Hill Software, 415/851-8702, $99.** It's easy to enter contact information, but this PIM is slim on speed, features, and flexibility. May 95

★★★★ **DateBook & TouchBase Pro Bundle 4.0, Adobe Systems, 415/961-4400, $89.99.** Personal information manager package is now easier to use and offers many new features. The excellent linking between contacts and calendar is the most significant feature. Sep 94

★★★ **Day-to-Day Organizer 1.0, Portfolio Software, 802/434-6400, $149.95.** The address-book and outlining components of this organizer are great, but overall, it's a mixed bag. The calendar interface and the way it handles recurring events need to be improved. May 95

★★★ **Dynodex for Macintosh 3.5 (3.5.2), Portfolio Software, 802/434-6400, $69.95.** Although this program doesn't link to a calendar, it is an excellent contact manager. This upgrade has a few new features, improved performance, and an easier-to-use interface. Sep 94

★★★ **Expresso 1.0, Berkeley Systems, 510/540-5535, $69.99.** The just-the-basics approach of this calendar and address book might be just fine for people who don't need the feature set of other calendar programs and enjoy its graphics. Apr 95

★★★ **FastPace Instant Contact 1.0 (1.1), Attain Corp., 617/776-1110, $39.99.** Although this contact manager could use a few additional features—especially a menu-bar search function—it does a capable job, and it is intuitive and easy to use. Jan 95

★★★ **FastTrack Schedule 3.0, AEC Software, 703/450-1980, $299.** Updated version of this project planner includes a detailed calendar, a customizable Gantt chart, and new formatting columns, but additional customization options would be helpful. Aug 95

★★★ **First Things First Proactive 1.1, Visionary Software, 503/246-6200, $149.** Capable scheduling program has some convenient features. It's worth a look if you don't have to share information with a contact manager. Nov 94

★★★★ **In Control 3.0.4 (3.0.7), Attain Corp., 617/776-1110, $85.** Excellent to-do-list manager and outliner, coupled with a good calendar is a strong choice if you live and die by to-do lists. Oct 94

★★★★ **Now Contact and Now Up-to-Date 3.0, Now Software, 503/274-2800, $99.** Taken together, this contact manager and calendar provide a set of solid, reliable tools for keeping your life in order. Users who need to share information over a network may find it close to ideal. Apr 95

★★ **Peanuts Family Organizer 1.0, Individual Software, 510/734-6767, $19.95.** "Hey, Pop, can I borrow the car Saturday night?" "Look at the family PIM and check my calendar, Son." This organizer's endearing interface doesn't make up for missing or poorly implemented features. Jun 95

★★ **Souvenir 2.2, ComposeTel, 415/327-0744, $49.** While this contact manager is fast and simple, it's hard to recommend it when you can buy integrated contact managers and schedulers for about the same price. Dec 94

PRESENTATION TOOLS

★★★★ **Adobe Premiere 4.0 (4.0.1), Adobe Systems, 415/961-4400, $795.** Video-editing software remains as solid and reliable as previous versions, and also advances far and above its competitors with new and improved professional-level features. With the right hardware, it can give desktop-video editors broadcast-quality products with a minimum of compromises. Dec 94

★★★ **Amazing Animation 1.0, Claris Corp., 408/727-8227, $49.** Cute pictures, funny sounds, and a kid-friendly interface come together in this package that lets children produce short animations or interactive presentations. The canned animations and scenes grow tiresome, however. Jan 95

★★ **Animation Master 2.0.5 (2.09), Hash Inc., 206/750-0042, $699.** Although this animation software packs extraordinary power at a reasonable price, it's difficult to learn and prone to instability. Oct 94

★★★ **Electronic Marker 1.0.2, Consumer Technology Northwest, 503/643-1662, $34.95.** This annotation tool can enhance live demonstrations and on-screen presentations, but it needs better controls for modifying and preserving markup layers. May 95

★★★ **HyperCard 2.2, Apple Computer, 408/996-1010, $249.** Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happily building stacks. Sep 94

★★ **Living Album 2.5, QuickMedia Labs, 408/749-9200, $129.95.** A crowded interface detracts from the usefulness—and aesthetics—of this multimedia album. May 95

★★★★ **Macromedia Director 4.0 (4.04), Macromedia, 415/252-2000, $1195.** Although this multimedia program remains far from easy to use, this admirable upgrade increases the program's power and improves its interface. Sep 94

★★★ **Microsoft PowerPoint 4.0, Microsoft Corp., 206/882-8080, $339.** If you're in the market for a presentation-graphics program, this is a good choice to use along with Word or Excel, as long as you don't mind the lack of animation functions. For general purposes, though, other alternatives have the edge. Feb 95

★★ **MovieWorks 2.0.2, Interactive Solutions, 415/377-0136, $295.** With diligence you can get decent results with this all-in-one QuickTime-based multimedia package. But other entry-level programs make leaping into multimedia easier and more rewarding. Sep 94

★★ **mPower 2.0, Multimedia Design Corp., 704/523-9493, $295.** Despite a handful of sophisticated multimedia features, this authoring tool is too limited to be compelling. While its push-button interface is easy to understand, it's far too cumbersome. Apr 95

★★★ **The Multimedia Workshop, Davidson & Associates, 310/793-0600, $79.95.** Children or adults can use this media-integration tool without big investments of time or money. It's full of compromises, though, such as the inability to layer narration over music. Nov 94

★★★★ **Persuasion 3.0, Adobe Systems, 206/622-5500, $495.** Users have plenty of new features to cheer about, including improved tool palettes, extensive charting options, and hypertext functions with this presentation graphics program's upgrade. Sep 94

★★★★ **Presenter Professional 3.0, VIDI, 818/358-3936, $1995.** The improved interface, enhanced animation module, and reduced price of this 3-D modeling and animation package make it an excellent choice

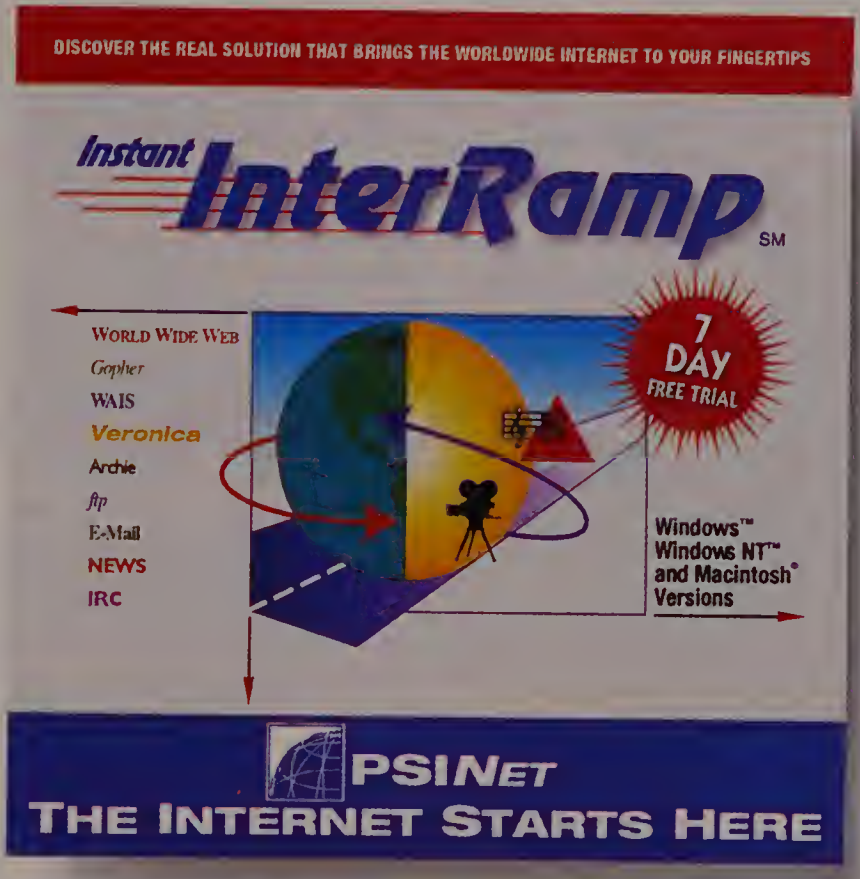
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Star Ratings

for multimedia producers. The new audio features are especially appealing. **May 95**

★★★ **SoundEdit 16, Macromedia, 415/252-2000, $379.** Digital audio software supports 16-bit sound and has enough goodies to earn it a place in a multimedia producer's toolbox. But its lack of record-level controls limits its usefulness as a professional audio tool. **Dec 94**

★★ **Special Delivery 2.0, Interactive Media Corp., 415/948-0745, $399.** Multimedia authoring tool can be confusing and isn't the best choice for complex projects. Still, it may save hours of training for users who merely need to create simple presentations. **Apr 95**

★★★★ **SuperCard 1.7.1 (2.0), Allegiant Technologies, 619/587-0500, $495.** Multimedia authoring system adds a few welcome enhancements and squashes some old bugs. For current users, the upgrade is well worth the price; for others, it's an excellent alternative to more expensive authoring systems. **Feb 95**

★★★★ **TransJammer, Elastic Reality, 608/273-6585, $149.95.** Plug-in for Adobe Premiere and Avid VideoShop offers 100 customizable video-transition effects, ranging from the conventional to the odd (like falling cows). If you've ever tried to make your own falling-cows transition, you'll appreciate this time-saving tool. **Aug 95**

PROGRAMMING

★★★★ **IDL 3.5 (3.6), Research Systems, 303/786-9900, $1500.** In this shockingly powerful, compact, graphics-oriented, interpreted language, a single command is worth a page of C-language code. If you're an image processing professional, you should consider adding IDL to your tool kit. **Oct 94**

★★ **5criptWizard 1.0, Full Moon Software, 408/253-7199, $99.** Software attempts to make writing and debugging AppleScript scripts easier, but it doesn't offer enough improvement over Apple's Script Editor. **Jan 95**

★★★ **5ymantec C++ 8.0, 5ymantec, 503/334-6054, $499.** The new version of this development environment offers native PowerPC compilers for C++ and ANSI C. The project manager and class browser have been improved and the compiled code is laudable, but our reviewer had some complaints about the package's resource demands and the company's support reputation. **Jul 95**

★★★★ **VIP-C 1.5 (1.5.1), Mainstay, 805/484-9400, $495.** For convenience in producing 680X0/Power Macintosh applications, this programming utility is a fine investment. Intermediate to advanced users will get the most benefit, but even beginners will find that it helps turn student projects into serious apps. **Feb 95**

UTILITIES

★★★ **Aladdin Desktop Tools 1.0, Aladdin Systems, 408/761-6200, $89.95.** Not all the utilities in this collection are perfectly implemented, but Desktop SpeedBoost and Desktop Printer make the package worth its price. The rest can be considered a bonus. **Aug 95**

★★ **Apple Personal Diagnostics 1.0 (1.1), Apple Computer, 408/996-1010, $129.** In trying to make a hardware tool for the rest of us, Apple has come up short. This hardware-diagnostics utility has an uneven manual, some less than thorough tests, and a surprisingly unsatisfying interface. **Nov 94**

★★★★ **Cal 1.0, Thought I Could, 212/673-9724, $79.95.** Well-chosen set of desktop necessities includes an excellent calculator, an associated-formula editor, a datebook, and a calendar. Due to its easy access and ample power, this software has become an everyday tool for our reviewer. **Jan 95**

★★★ **CanOpener 3.0, Abbott 5ystems, 914/747-4171, $125.** You can use this handy utility to open many types of files—which can be a lifesaver if you don't have the application a file was created in—but it falls a little short in the file-search department. **May 95**

★★★★ **CD Directory 1.0, Insignia Solutions, 415/694-7600, $69.95.** Store catalogs of CD directories on your hard drive—and access them at hard drive speeds—with this handy utility. One complaint: cataloged CDs are treated as local drives, greatly increasing search time during a global search. **Jul 95**

★★★ **Color Compass 1.0, Praxisoft, 703/729-3391, $129.** Speedy, specialized tools allow you to blend, match, and tweak colors in subtle ways not possible in most programs. Although graphics experts might not need this program, it provides helpful visual feedback for creating and organizing color palettes. **Aug 95**

★★★★ **Disc-To-Disk, Optical Media International, 408/376-3511, $199.** Audio-capture utility's friendly interface provides a simple way to transfer sound from a CD to the Mac's hard drive. A useful tool for multimedia authors. **Jun 95**

★★★★ **DiskGuard 1.0.1 and DiskGuard Remote, ASD Software, 909/624-2594, $129 to $799.** Rock-solid, flexible disk-protection tools are worth serious consideration if your Mac or Macs are accessible to other users. The remote version (which comes in five- and ten-user packs) adds network features, including clock synchronization. **Mar 95**

★★★ **DragStrip 1.0, Natural Intelligence, 617/876-4876, $39.95.** Icon-based file and folder organizer brings a semblance of order to your cluttered desktop. But your troubles aren't over unless a future version lets you label folders. **May 95**

★★★★ **Drive7 3.0 (3.09), Casa Blanca Works, 415/461-2227, $89.95.** Highly recommended hard drive-formatting utility easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. **Nov 94**

★★★ **eDisk 2.0, Alysis 5oftware Corp., 415/928-2895, $149.95.** Driver-level software compresses data read to your drive on the fly and automatically expands data read from your drive. It offers transparent compression. **Dec 94**

★★★★ **FolderBolt Pro 1.0.3, Kent Marsh, 713/522-5625, $129.95.** Feeling unsecured? Top-notch encryption schemes and flexible access controls let you secure your Mac's contents by password-protecting folders and encrypting the data they contain. **Jul 95**

★★★★ **Graffiti 1.01, Palm Computing, 415/949-9560, $79.** If you can't seem to teach Newton your handwriting, you can teach yourself a new writing system that Newton can handle. Kind of makes you wonder who's running the show, but it works. **May 95**

★★★★ **Kaboom 3.0, Nova Development Corp., 818/591-9600, $49.95.** Sound-effects utility with sound-editing application is a fun program for anyone who wants to play with sound. **Feb 95**

★★★★ **Launch Pad 1.0, Berkeley 5ystems, 510/540-5535, $49.99.** If you want to share your Mac with your kids, this desktop utility is a worthwhile investment. It can even speak menu items and file names out loud for kids too young to read. **Jan 95**

★★★ **MacTools Pro 4.0, Symantec Corp., 503/690-8090, $149.95.** This utility does a good job of diagnosing and fixing disk problems, but suffers from large RAM requirements and expensive tech support. **May 95**

★★★★ **Maxima 3.0, Connectix, 415/571-5100, $99.** If you have more than 8MB of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. **Nov 94**

★★★★ **MultiClip Pro 3.1, Olduvai Corp., 305/670-1112, $59.** Easy-to-use utility is exactly what Apple's Clipboard and Scrapbook should have been; a convenient repository of data that moves between documents without fuss or muss. **Apr 95**

★★★ **Multimedia Utilities 1.1, Motion Works, 415/541-9333, $299.** Six utilities address QuickTime moviemaking, from editing movies and sound tracks to creating morphs, animations, and screen recordings. Although the utilities are appealing, you must save early and often because of frequent crashes. **Jul 95**

★★★★ **Norton DiskDoublerPro 1.1, Symantec Corp., 503/334-6054, $109.** Utility collection includes DiskDoubler, AutoDoubler, and CopyDoubler. Because of its ease of use, the product is a good choice for beginners. **Feb 95**

★★★ **Norton Utilities for Macintosh 3.1, Symantec Corp., 503/334-6054, $149.95.** Data-protection and -recovery utility collection is leaner, meaner, and faster than ever before, but it's also surprisingly uneven. While Disk Doctor leads the pack for disk-repair utilities, the back-up module is weak and the new UnErase module is missing some features. **Feb 95**

★★★★ **Now Utilities 5.0, Now 5oftware, 503/274-2800, $89.** Three of the modules of this fine-tuned, interlocking utility set—Now FolderMenus, Now Menus, and Now SuperBoomerang—are almost indispensable, and while the other six may not be tops in their category, they're well worth considering. As a collection, this package remains the best in the business. **Jan 95**

★★★★ **OptiMem RAM Charger 2.0.1, Jump Development Group, 412/681-2692, $129.** Use RAM more efficiently with this memory-management utility. The Mac OS ought to work like this, but until it does, you should use this nifty utility. (An added bonus: it works on older Macs, back to the Mac Plus.) **Jul 95**

★★★ **PaperPower 1.0, Piptel, 513/294-6656, $149.** Graphics-tablet utility provides a useful tool for creating and using macros, but the overlays it creates can be tricky to use. **Apr 95**

★★★ **Peirce Print Tools 1.0, Peirce 5oftware, 408/244-6554, $129.** Nine handy printing utilities work with QuickDraw GX. Most of the modules are useful, but not all are must-haves. **Jan 95**

★★★★ **PowerAgent 1.1 (2.0), 5outhBeach Software Corp., 305/942-0605, $159.** You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro. **Nov 94**

★★★ **RapidCD 1.04, Insignia Solutions, 415/694-7600, $69.95.** RAM and disk caching of CD-ROM data speeds access to frequently used data. This utility does its job well, but it's incompatible with the AppleCD Audio Player and doesn't allow you to add to its settings. **Jul 95**

★★★ **RescueTxt 1.0, Abbott Systems, 914/747-3116, $79.** If you want decent performance and the ability to locate text in even a deleted file, this text-retrieval utility is a good choice. But it doesn't tell you what file the text comes from, so you can't just open the found file. **Apr 95**

★★ **5C5I Director Pro 3.0.6 (3.1.1), Transoft Corp., 805/565-5200, $99.** Utility provides simple, one-button hard disk formatting, but when it comes to doing fancy tricks, the going gets rough. **Sep 94**

★★★★ **Square One 2.0 (2.0.1), Binary Soft-**

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Star Ratings

ware, 310/449-1481, $74. The slick design, flexibility, and straightforward interface of this file-launching utility make it a pleasure to use. Dec 94

★★★ **Stop & Go 4.0, Engram International, 415/455-1100, $69.99.** File-protection/relaunch utility uses a portion of your hard disk to save a snapshot of the data in your Mac's RAM. It's fast, and it relaunches files, applications, and extensions in a single, unified process, but it's unduly complicated. Oct 94

★★★★ **StuffIt Deluxe 3.5, Aladdin Systems, 408/761-6200, $129.95.** If you're looking for a compression solution, you should look at this product. Its drag-and-drop applications, Magic Menu, and file translators make it easy to integrate compression into your routine. Mar 95

★★★★ **TypeTamer 1.0.4, Impossible Software, 714/470-4800, $59.95.** Versatile font utility provides information on installed fonts and simplifies tasks such as typing special characters and reselecting fonts from the menu. May 95

★★★★ **Virex 5.5.1, Datawatch Corporation, 508/988-9700, $99.95.** Comprehensive, reliable, and speedy utility helps protect your files from those misguided lads who get their jollies by releasing viruses. To keep it current, updates are available on online services. May 95

★★★ **Zonkers 1.0, Nova Development, 818/591-9600, $19.95.** Redecorate your Mac with this collection of silly desktop enhancements. Customize icons, scroll bars, cursors, buttons, menu bars, windows, and desktop patterns to create your own look. Aug 95

VERTICAL MARKETS

★★★ **Autoscore 1.0, Wildcat Canyon Software, 510/527-5155, $150.** Converting the human voice into MIDI note information is a challenging task. If you have the right music software, mike, and voice, this music-recognition software can actually pull it off. Feb 95

★★★ **Bird Brain 2.01, Ideaform, 515/472-7256, $99.95.** Database lets bird watchers record every sighting of every bird they have ever seen to create electronic life lists. Although it can be slow, it includes species names and other information. Jan 95

★★★ **ConcertWare 1.5.7, Jump Software, 415/917-7460, $159.** Although it lags behind the competition in performance and features, this music-notation program's low price and ease of use make it a viable choice for the budget-wise. Jun 95

★★★ **DigiTrax 1.1, Alaska Software, 408/738-3320, $349.** If you're an amateur musician or a multimedia producer with modest sound-recording needs and you have a Quadra AV, consider this audio-recording software. What it lacks in features, it makes up for in simplicity and a relatively low price tag. Mar 95

★★★ **ErgoKnowledge 1.0, Visionary Software, 503/246-6200, $395.** Despite a few shortcomings, this CD-ROM offers a good, basic review of office-computer ergonomics. Dec 94

★★★ **Insta Software, Chang Labs, 408/727-8096, $29 per module.** No-frills, preprogrammed relational databases handle forms and record-keeping for specific businesses. Although they can't be customized, the databases are straightforward and require little training or setup. Aug 95

★★★ **MayaCalc 2.3.1 (2.3.3), Ecological Linguistics, 202/546-5862, $120.** 4th Dimension database alleviates much of the pain involved in working with the complex, multilayered Maya calendar. Although the design could be improved, it's a highly useful tool for both serious and casual Maya enthusiasts. Feb 95

★★★★ **Maya Hieroglyphic Fonts, Ecological Linguistics, 202/546-5862, $10 to $60 per set.** Although these fonts based on Mesoamerican hieroglyphic scripts are beautifully rendered, the character spacing is sometimes uneven. Feb 95

★★★★ **Mayo Clinic Family Health Book, IVI Publishing, 612/996-6000, $69.95.** Medical CD-ROM for home use deals with the full gamut of health-care topics, from AIDS to zygotes, although it doesn't include any reference to alternative therapies. Sep 94

★★★ **Mayo Clinic: The Total Heart 1.0, IVI Publishing, 612/686-0779, $21.75.** Cardiovascular health and related subjects are the topics of this medical CD-ROM for home use. Although it makes liberal use of drawings, photographs, and animations, video sequences would have been more effective. Sep 94

★★★ **Medical HouseCall 1.0, Applied Medical Informatics, 801/464-6200, $99.95.** Interactive medical guide is a painless way for people to learn about diseases, tests, and therapies. Although it's easy to use and interesting, some images were incorrectly labeled. Feb 95

★★★ **MusicTime 2.0 (2.0.1), Passport Designs, 415/726-0280, $149.** Music-notation program is geared for hobbyists and students. If your needs aren't complex, it may fit the bill, at a great price. Oct 94

★★★★ **Overture 1.02, Opcode Systems, 415/856-3333, $495.** Easy-to-learn, midrange notation software has a friendly interface and shows real polish. If you don't need all the features of a high-end product, it's a serious contender. Apr 95

★★★ **Performer 5.02, Mark of the Unicorn, 617/576-2760, $495.** A colorful, redesigned interface and improved sheet-music view are just part of this MIDI recording program's worthwhile overhaul. If you like the sheet-music view, this is the product to buy. Mar 95

★★★★ **Practica Musica 3.0 (3.1), Ars Nova Software, 206/889-0927, $140.** Music-teaching program, with emphasis on sight-reading and ear-training techniques, shines as a smart, infinitely patient personal music coach in the classroom. Jan 95

★★½ **Route 66 1.5, Route 66 Geographic Information Systems B.V., 415/957-0666, $79.95.** Jack Kerouac could have saved a lot of time if he'd used this route planner (unless he was planning to drive to Alaska, which isn't included). It's fast, but omits some cities and can't handle more than three destinations at a time. May 95

★★★ **SAM-CD, Scientific American Medicine, 212/754-0550, $395.** Despite a few shortcomings, such as the poor interface for case simulations, this medical reference work—a popular series of publications covering topics in clinical medicine—should prove a worthwhile addition to any medical library. Sep 94

★★★ **Vision 2.08, Opcode Systems, 415/856-3333, $495.** MIDI program's list of exclusive, creativity-slanted features, such as endless count off and scrubbing (which lets you hear the music as you drag across it), give the program a usability edge. Mar 95

WRITING TOOLS

★★★★ **Bookends Pro 3.1, Westing Software, 415/435-9343, $129.** Comprehensive database program catalogs and stores all of your reference material—actual quotes as well as citations. It's a useful tool that researchers will appreciate. Mar 95

★★★★ **EndNote Plus 2.0, Niles & Associates, 510/649-8176, $299.** Despite its power, this indispensable bibliography and citation manager is surprisingly easy to learn and use. If you have to work with references, it's a good choice. Apr 95

★★★ **FullWrite 2.01, Akimbo Systems, 617/776-5500, $395.** As the leanest of all high-end word processors, this product requires only 2MB of RAM. Its modular architecture is complex, but it's worth considering if you don't need to share files with the Word/WordPerfect crew. Apr 95

★★★ **Grammatik 6 for Macintosh, Novell, 801/225-5000, $49.95.** The low price, pleasant interface, and improved accuracy of this grammar checker make it worthwhile for a large number of quality-driven writers. It still misses some errors. Feb 95

★★★ **Inspiration 4.1, Inspiration Software, 503/245-9011, $195.** Writing tool allows you to move between words and diagrams to show the relationships between ideas. This version adds improved keyboard controls, import and export capability, plus more. Apr 95

★★★ **Microsoft Word 6.0, Microsoft Corp., 206/882-8080, $339.** If you can put this word processor's new features—including cross-referencing, AutoText, automatic numbering, macros and more—to work and you have a Quadra 650 or faster Mac, take the plunge. If you have a slower 68040 Mac, think twice; and if you have a 68030 Mac, don't even think about it. Feb 95

★★★ **Nisus Writer 4.0, Nisus Software, 619/481-1477, $495.** In a few specialized areas—such as mixing English and non-Romance languages—this word processing program is unmatched. However, for some high-end uses, such as table creation, it's a poor choice. Mar 95

★★ **Read-It O.C.R. Pro 5.0, Olduvai Corp., 305/670-1112, $395.** Although this OCR software has a nice collection of features, its recognition engine isn't up to par. It's not a first choice unless you simply need to process piles of very clear Courier text. Apr 95

★★★ **TextBridge 2.0, Xerox Imaging Systems, 508/977-2000, $99.** Optical character recognition software is impressive on good documents and can be trained and automated. Sep 94

★★★ **Three by Five 2.0, MacToolkit, 310/395-4242, $99.** How retro! This idea organizer uses the metaphor of index cards on a corkboard. Unlike real index cards, the program lets you attach QuickTime movies, link cards, or switch to an outline view. Aug 95

★★★ **Writing Coach 1.0, WritePlace Software, 503/484-6380, $89.** If you'd like help with your writing, this writing-skills tutorial could be a great investment. Skillfully worded worksheets assist with planning, organizing, and revising. Dec 94

Hardware

INPUT DEVICES

★★★★ **ArtPad, Wacom Technology, 206/750-8882, $199.** Measuring less than 7 by 7½ inches, this pressure-sensitive tablet is sheer convenience if you're looking for a device that you can hide away one moment and readily exhume the next. Apr 95

★★★★ **DrawingSlate II, CalComp, 602/948-6540, $395.** A responsive stylus and user-definable macros make this digitizing tablet an excellent choice for artists and illustrators. Jun 95

★★★★ **FlightStick Pro for Macintosh, CH Products, 619/598-2518, $129.95.** The authentic feel of this joystick, along with well-conceived software, make it a nearly perfect desktop pilot's companion. Dec 94

★★★ **GlidePoint, Alps Electric, 408/432-**

continues

BLUE BUILDING BLOCKS

BLUE STORM — Performance Drive

BLUE LIGHTNING — SCSI Accelerators

BLUE SPARK — Accelerated Storage

BLUE STREAK — Raid 0 and 1

BLUE STREAM — DAT Tape Back-Up

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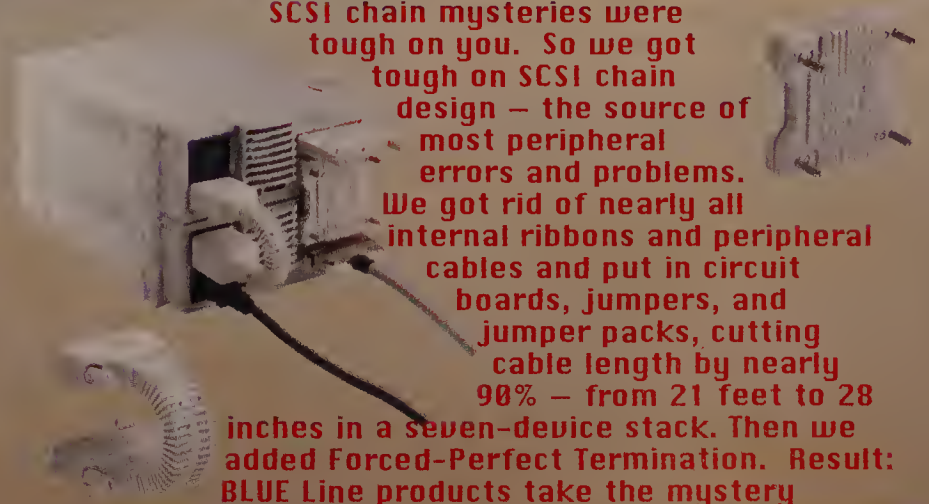
It's not just a better box. It's a better idea. Interlocking BLUE Line cases — each with four-inch power jumper — make rock-solid vertical or horizontal stacks a snap to build and to run off a single cord. Side-mount power-supply vents heat away from the drive. User-modifiable, front-mount LCD panel supports Power-Up, SCSI addressing, and Power Up sequencing. Need tech help? The LCD even provides Microtech's support number. All this plus enhanced data channel and subsystem design mean true BLUE Line excellence.

REMOVABLE OPTIONS



BLUE Line fixed drive solutions can also be configured as removable, shuttle-based units mounted on front-removable sleds, providing up to 4Gb of Fast/Narrow or Fast/Wide portable storage. Available separate docking stations enable you to transfer gigabytes of data without unplugging a single cable — great for digital video, pre-press, and graphics applications.

SCSI Chain Improvements



SCSI chain mysteries were tough on you. So we got tough on SCSI chain design – the source of most peripheral errors and problems. We got rid of nearly all internal ribbons and peripheral cables and put in circuit boards, jumpers, and jumper packs, cutting cable length by nearly 90% – from 21 feet to 28 inches in a seven-device stack. Then we added Forced-Perfect Termination. Result: BLUE Line products take the mystery out of SCSI chain management.



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11:30 & 2:30 • RAID for the rest of us — *Understanding RAID storage solutions with applications in prepress and publishing.*

Noon: Digital Photography — *the FlashFilm and PC card (PCMCIA) storage connection.*

12:30 to 3:00 • SCSI VOO DOO — *Top ten tips 'n tricks for troubleshooting storage problems.*

1:00 to 3:30 • Everything you need to know about removable storage — *from optical media to PC Card (PCMCIA).*

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Star Ratings

6000, $99. If you find moving the mouse a pain in the arm, you might want to try this alternative pointing device, which lets you position the cursor by moving your finger across its surface. **Jul 95**

★★★★ **Mac Keyboard Deluxe, MicroSpeed, 510/490-1403, $125.** If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. **Nov 94**

★★★ **MacAlly, The Mace Group, 213/780-6110, $49.** It may not be a better mouse, but it's a cheaper one. This ADB mouse doesn't stand out from the crowd, but it's durable, glides smoothly, and won't leave a big hole in your pocketbook. **Jul 95**

★★★ **Mouse Deluxe Mac, MicroSpeed, 510/490-1403, $69.** The extra buttons of this mouse offer several features that Apple's mouse doesn't match, but its shape may not suit everyone's taste. **Mar 95**

★★★★★ **PaperPort, Visioneer, 415/812-6400, $399.** The paperless office is actually here. This clever combination of elegant hardware and intelligent software makes it easy to capture, organize, and retrieve documents. Once a page is scanned in, you can annotate it; run it through OCR software; or print, fax, or E-mail it. **May 95**

★★★ **QuePoint, MicroQue, 801/263-1883, $149.** Tired of shoving a mouse around? Slide your finger across this tiny input device to manipulate the cursor with a minimum of movement. **May 95**

★★★ **Remote Point, InterLink Electronics, 805/484-1331, $199.** Although it may not be a first choice for desktop work, this infrared pointing device is an elegant workaround for users who don't want to (or can't) be tethered to their Macs. **Apr 95**

★★★★ **Thinking Mouse Macintosh ADB, Kensington Microware, 415/572-2700, $139.95.** A mouse is a mouse is a mouse. Not so. This one has four programmable buttons that you can use—with the accompanying software—to automate such tasks as selecting commands and typing text. **May 95**

MISCELLANEOUS HARDWARE

★★★★ **AirNote 1.0 (1.1), Notable Technologies, 510/208-4400, $299.** Remote-messaging service lets you originate alphanumeric paging messages from your own computer, eliminating both dictation charges and errors in translation. It's a very handy way to get into alphanumeric paging. **Dec 94**

★★★ **Apple PCMCIA Expansion Module, Apple Computer, 408/996-1010, $219.** Well-integrated, well-designed unit offers 500-series users an efficient and easy albeit expensive way to add features to their PowerBooks. If you can overlook the early-adopter prices (a big if), the PC Cards are great expansion options—lightweight, low-power, and high-performance. **Mar 95**

★★★★ **Colortron, Light Source Computer Images, 415/925-4200, $1195.** Getting the colors on your screen to match those in your printed output is now easy and affordable, thanks to this hand-held spectrophotometer, which measures both transmissive and reflective sources. **Jun 95**

★ **EAB401P Speakers, Panasonic Communications & Systems, 800/742-8086, $99.** Small, inexpensive speakers provide less-than-state-of-the-art performance. The audio is thin and reedy. **Apr 95**

★★ **EAB701P Speakers, Panasonic Communications & Systems, 800/742-8086, $249.** The sound of these speakers is thin and slightly harsh, although they are attractive in a high-tech sort of way. **Apr 95**

★★★★ **MM5557, Audio-Technica USA, 216/686-2600, $149.95.** Among a huge selection of similarly priced speaker systems, these stand out as a best buy. They look good, as well as sound good. **Apr 95**

★★★★ **Multi5pin 4Xe, NEC Technologies, 708/860-9500, $515.** With its competitive price, free tech support, and two-year warranty, this quad-speed CD-ROM player is ready to race. **Feb 95**

★★ **NEC AudioTower, NEC Technologies, 800/632-4636, $99.** Looks great; sounds mediocre. Although this speaker system provides a convenient jack for an external CD drive, the sound quality is nothing to shout about. **May 95**

★★★★ **Photo Engine, Radius, 408/541-6100, $1099.** Photoshop acceleration hardware's suite of four 66MHz 32-bit DSP chips offers sufficient processing power to speed up 25 Photoshop functions on the most sophisticated systems, including Power Macs. **Feb 95**

★★★★ **Reno Portable CD-ROM Player, MediaVision, 510/770-8600, $349.** Have CD-ROM, will travel. Portable player is lightweight, versatile, and easy to set up; the only complaint is its short battery life. **Jun 95**

★★★★ **SCSI Sentry, AP5 Technologies, 816/483-6100, $79.95.** Although the price of this terminator may seem steep, this device may well be the cure for SCSI woes. Our reviewer heartily recommends it. **Sep 94**

★★★★ **Vivace, Coda Music Technology, 612/937-9611, $2295.** As an intelligent and endlessly patient accompanist, this music study system for wind instruments may be the best thing that's happened to learning wind literature since the metronome. **Jan 95**

★★★ **Vivid 3D Pro, NuReality, 714/442-1080, $149.95.** This sound-enhancement system uses the SRS technique to produce 3-D sound from a pair of speakers. While it's great for system sounds and games, it's less impressive for audio CDs. **Aug 95**

★★★★ **YST-551010, Yamaha Corporation of America, 714/522-9240, $349.95.** With a name like YST-SS1010, you have to be good. And it is. This satellite-and-subwoofer speaker system is highly recommended, despite its mediocre manual. **Jul 95**

MODEMS/NETWORK HARDWARE

★★ **Cooperative Adapter, Photonics Corp., 408/955-7930, $449.** The high cost of each unit, the limitations and restrictions inherent in diffuse infrared, and the extremely low cost of traditional LocalTalk adapters and cabling make this infrared network interface an expensive niche product. **Dec 94**

★★★ **DaynaPort Pocket 5C5I/Link, Dayna Communications, 801/269-7200, $299 to $369.** Inexpensive, lightweight SCSI-to-Ethernet connector works with both desktop Macs and PowerBooks and can use the Mac's ADB port as a power source. **Nov 94**

★★★ **Fast5witch 10, Grand Junction Networks, 510/252-0726, $6250.** Switched Ethernet hub is a great solution for networks that handle large amounts of data traded peer-to-peer, but if your network consists of E-mail and a file server, you probably won't see much benefit in stepping up to switched Ethernet. **Dec 94**

★★★★ **OneWorld Internet 1.0, 700 Series, Global Village Communication, 408/523-1000, $1699 plus monthly fee.** Users of an office network can connect to the Mother of All Networks with this Internet gateway. It offers E-mail and direct Internet access in an approachable format. **Jun 95**

★★★ **Pocket EtherTalk Adapter, Xircom, 805/376-9300, $349 to 399.** All-in-one SCSI-to-Ethernet connector is lightweight and works with desktop Macs and PowerBooks. **Nov 94**

★★★★ **PowerPort Mercury/PB 500 Series, Global Village Communication, 408/523-1000, $399.** Top-notch internal fax modem for 500-series PowerBooks is capable of exemplary fax and data communications performance. **Nov 94**

★★★ **Spectra-Com P192mx, Bay Connection, 408/270-8070, $169.** If you must have absolute portability and AC power isn't available, this pocket data/fax modem can do the job. It's not that much smaller than a regular desktop modem, however. **Oct 94**

★★★★ **TelePort Platinum, Global Village Communication, 408/523-1000, $279.** If you want V.34 (28.8-Kbps) data and 14.4-Kbps faxing capability, incoming-call recognition, and an answering machine—all over a single telephone line—this reliable fax modem has it all covered. **Aug 95**

PRINTERS

★★★★ **Apple Color StyleWriter 2400, Apple Computer, 408/996-1010, $525.** Economical, QuickDraw-based color ink-jet printer offers gorgeous color output plus fast black-and-white printing. If you don't need DOS/Windows compatibility, it's a good buy. **Apr 95**

★★★★ **HP LaserJet 5MP, Hewlett-Packard, 800/752-0900, $1299.** This laser printer meets the high demands of small businesses and home offices with features such as 600-dpi resolution, support for Adobe PostScript Level 2, and automatic-input switching between DOS/Windows machines and Macintosh networks. Memory Booster software makes good use of the printer's 3MB of RAM. **Jul 95**

★★★★ **LaserWriter 16/600 P5, Apple Computer, 408/996-1010, $2399.** If speed is what you need, this fine printer is it. The price is reasonable. **Mar 95**

★★★ **Phaser 140, Tektronix, 503/627-7111, $1695.** If you're looking for a capable color printer for a small workgroup, this ink-jet is a great choice. It provides only 17 resident fonts, however. **Apr 95**

★★★ **Pictura 310, Fargo Electronics, 612/941-9470, $4995; optional Adobe Level 2 PostScript package $795.** While this tabloid-size thermal-wax and dye-sublimation printer is affordable and produces acceptable print quality, it's not to dye for. Its substandard color-matching capabilities don't measure up to those of its competitors. **Jul 95**

★★★★ **PowerPrint 2.5 (2.5.2), GDT Softworks, 604/291-9121, $149.** Ingenious hardware-software combo lets the Mac print to almost any PC printer. It supports over 1000 printers, from aging dot matrix models to the newer color ink-jet and laser printers. **Sep 94**

★★★ **PrimeraPro, Fargo Electronics, 612/941-9470, $1895.** The photo-realistic output of this thermal-wax and dye-sublimation printer beats that of any other printer in the price range. But with expensive consumables and slow print time, it's best suited for routine thermal-wax use and occasional dye-sub work. **Jan 95**

★★★ **P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, $449.95.** Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. **Sep 94**

★★★★ **Stylus Color, Epson America, 310/782-0770, $699.** This color ink-jet printer is no speed demon at 720-dpi resolution, you need special paper for hi-res output, and it offers no color correction. But who cares? The print quality is superb and the price is reasonable. **May 95**

continues

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SCANNERS

★★★ **Fujitsu ScanPartner Jr., Fujitsu Computer Products of America, 408/432-6333, $499.** Compact scanner with good OCR software makes converting hard-copy documents to editable text a snap. While it's an economical and fuss-free scanning solution, its page feeder doesn't offer the paper-size and -shape flexibility of a flatbed scanner. **Jul 95**

★★ **Pro Imager 4000, PixelCraft, 510/562-2480, $2995.** This midrange scanner delivers excellent highlight detail but produces a lot of noise in shadow areas. It doesn't measure up to similarly priced competitors in speed or image quality. **Jun 95**

★★★★ **Pro Imager 8000, PixelCraft, 510/562-2480, $12,995.** Demanding prepress users will like this scanner's tonal sensitivity, high resolution, large image area, and impressive speed. Although its color-adjustment software needs work, this is a superb scanner. **Jun 95**

★★★ **Reli 4830T, Relisys, 408/945-9000, $1699.** The good: high-quality scans, midrange price; lots of bundled software. The bad: slow performance, quirky scanning software. The upshot: If you can live with the cons, this scanner is a bargain. **Jun 95**

★★★★ **SprintScan 35, Polaroid, 617/386-2000, $2495.** Compact, efficient scanner offers a cost-effective way to transfer images from 35mm slides or negatives to a Mac. **Jun 95**

★★★ **Vista-S8, Umax Technologies, 510/651-8883, $995 (LE+); $1095 (Pro+).** This 24-bit color flatbed scanner has a lot of useful features for its low price, including crisp line-art scans and speedy previews. It's a bargain if you can overlook its slow OCR scanning and some scanning-software bugs. **Jul 95**

SYSTEMS/STORAGE

★★★★ **Alacrity PM 6100, KS Labs, 614/374-5665, $165.** Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's entry-level Power Mac. **Oct 94**

★★★★ **Brainstorm Accelerator for the Macintosh SE, Brainstorm Products, 415/988-2900, $199.** Your SE will never be a Power Mac or even a IIsi, but if your budget won't buy a new Mac, you can't do better than this accelerator, which pushes an SE's speed to close to a Classic II's in overall performance. **Mar 95**

★★★ **Conley SR2 RAID System, Conley Corp., 212/682-0162, $21995.** While RAID technology is typically praised for its fault-tolerance rather than its speed, this high-performance storage system proves that you can have both. **Sep 94**

★★★ **Envoy Wireless Communicator, Motorola, 800/894-7353, $1000 to $1500.** With its intelligent mail agents and well-integrated RadioMail software, this Magic Cap–based PDA was our reviewers' first choice for sending and receiving E-mail. **Aug 95**

★★★ **Joule System, La Cie, 503/520-9000, Price varies by component.** Plug-and-play tower lets you stack drives—including hard drives, removable media, and other modules—atop a base unit, making it easy to buy extra storage or swap modules with other Joule towers. Joule drive prices are generally slightly higher than for comparable drives, however. **Feb 95**

★★★ **Marco Wireless Communicator, Motorola, 800/894-7353, $900 to $1400.** This Newton OS–based PDA includes a radio modem. The RadioMail service offers E-mail, paging, outgoing faxes, and a news service, but it's pricey. **Aug 95**

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Star Ratings

★★★ **Master CD Pro, MicroNet Technology, 714/453-6000, $4995.** With support for multiple formats, this quad-speed, multisession, recordable CD-ROM drive is a good tool for professional CD production. It ain't cheap, though. **Aug 95**

★★★ **MessagePad 120, Apple Computer, 408/996-1010, $599, 2MB model $699.** Apple's PDA offers about three times the storage space of the other PDAs tested, and its industrial design is great, but handwriting recognition still needs work. With support for vertical applications, it's a good choice for specialized tasks like medical or inventory work. **Aug 95**

★★★★ **PLI Infinity 270 Turbo, PLI, 510/657-2211, $599.** This 270MB SyQuest drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives. **Sep 94**

★★★★ **Power 100, Power Computing, 512/258-1350, $2599 (base model).** The first Macintosh clone offers all the power of a Macintosh 8100/100 for about $700 less. It offers the speed, expandability, functionality, and compatibility Macintosh users expect, with the customer support and prices we've wanted for so long. **Aug 95**

★★ **PowerBook 150, Apple Computer, 408/996-1010, $1449.** Fast, lightweight portable is minimalist in the extreme, with no video-out, ADB, Ethernet, or microphone. Unfortunately, the price is less minimalist, and most budget-conscious shoppers would be better off buying a used or discontinued model. **Dec 94**

★★★ **PowerBook 540c, Apple Computer, 408/996-1010, $4839.** The prestige PowerBook du jour, this sleek, curvy and futuristic-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. **Oct 94**

★★★★ **PowerBook Duo 280c, Apple Computer, 408/996-1010, $3759.** If you travel a lot, this notebook computer is the best Mac to get. It offers close to the power of a Quadra 650 in a subnotebook. **Oct 94**

★★ **PowerBook Duo Dock II, Apple Computer, 408/996-1010, $969.** Apple has added Ethernet to this full-featured docking station, but installing NuBus cards is still absurdly difficult. **Oct 94**

★★★ **Power Macintosh 8100/110, Apple Computer, 408/996-1010, $6379.** High-end users who have invested heavily in NuBus cards can protect their investment with this top-of-the-line Power Mac. **Mar 95**

★★★ **Power Macintosh Upgrade Card, Apple Computer, 408/996-1010, $699.** Current 33MHz 040 machines will get the best bang for the buck with this card. However, other Macs won't realize as much of a performance gain. **Oct 94**

★★★★ **Quadra 630, Apple Computer, 408/996-1010, $1279.** Fast, inexpensive, expandable 33MHZ 68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. **Nov 94**

★★ **RCD-1000, Pinnacle Micro, 714/727-3300, $1695.** The software for this CD-Recordable drive is easy to use, but it's too unreliable to use as a day-to-day backup system. **Jun 95**

★★★ **Sony Magic Link, Sony, 800/571-7669, $699.95.** Using this PDA for short E-mail messages, phone calls, and appointment scheduling is a breeze, but only a handful of applications have been developed for it so far. Although the Personal Link messaging service is relatively inexpensive, its Telescript support is limited to other devices that use the Magic Cap OS. **Aug 95**

★★★★ **Zip Drive, Iomega, 801/778-1000, $199.95; 100MB cartridge $19.95.** Weighing in at about a pound, this external drive combines speedy performance, convenience, and economy in an attractive package. It uses 100MB cartridges the size of a floppy disk, and boasts near hard-drive speeds. What's not to like? **Jul 95**

VIDEO/DISPLAY

★★★ **Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, $1579.** 24-bit accelerated graphics card has a satisfactory price/performance ratio but can't switch resolutions from the keyboard. **Oct 94**

★★★★ **Apple Multiple Scan 15 Display, Apple Computer, 408/996-1010, $509.** The tridot tube of this 15-inch monitor provides a sharp and accurate image, but reflects some glare. The built-in stereo speakers reproduce sound nicely. **Feb 95**

★★★ **EAsycolor 24/1360, EA Research, 510/867-0967, $1699.** Video board offers Photoshop CMYK–mode acceleration and high-resolution support for multisynchronous monitors. Its software is minimal and its QuickDraw acceleration only adequate, but it's an affordable solution. **Aug 95**

★★★★ **FlexCam, VideoLabs, 612/988-0055, $595.** Small, unobtrusive desktop video camera has a flexible gooseneck for positioning. **Dec 94**

★★★★ **Multiscan 15sf, Sony Computer Peripheral Products, 408/432-0190, $569.95.** Trinitron monitor has a flat screen that displays sharp, bright, and accurate images. With good antiglare coating and adjustable image tilt, it's worth looking at. **Feb 95**

★★★★ **MultiSync 3V Monitor, NEC Technologies, 708/860-9500, $495.** With a bright display and great image quality, this monitor delivers a fine picture at a moderate price. **Feb 95**

★★★ **PaintBoard Prism GT, RasterOps, 408/562-4200, $999.** If you want QuickDraw acceleration and plentiful software options, this video board is a good choice. It doesn't offer Photoshop acceleration. **Aug 95**

★★★★ **Panelight ZX, Panelight Display Systems, 415/772-5800, $3995 to $4695.** LCD panel offers vivid images at a comparatively low price. It's a great choice for presenters. **Mar 95**

★★★ **QA-1500, Sharp Electronics Corporation, 201/529-8731, $5795.** LCD panel's display is crisp and flicker-free, but placing a presentation on its PC Card is cumbersome. Cheaper products are available. **May 95**

★★★★ **QuickCam, Connectix Corp., 415/571-5100, $149.95.** For as little as $99 (street price), this tiny, fun, easy-to-use, digital video camera lets users experiment with video input for making QuickTime movies or capturing still images. **Mar 95**

★★★★ **SpigotPower AV, Radius, 408/541-6100, $999.** Make full-screen, 30-fps movies with this first-rate video-compression-and-decompression board and accompanying JPEG software. **Jun 95**

★★★★ **Thunder IV GX 1360, Radius, 408/434-1010, $2999.** With its impressive QuickDraw and Photoshop acceleration and versatile software, this video board was our reviewer's first choice. It's more expensive than the competition, however. **Aug 95**

★★ **Tornado Graphics Card, Mirror Technologies, 612/832-5622, $699.** Inexpensive 24-bit accelerated graphics card has zoom and pan options but is relatively slow. **Oct 94**

★★★ **VideoDirector 1.5, Gold Disk, 408/782-0200, $199.95.** Low-end video-editing system lets you log, edit, and organize videotape footage, copying selections from a source deck to a record deck. A good choice for nonprofessionals. **Jun 95**

Macworld



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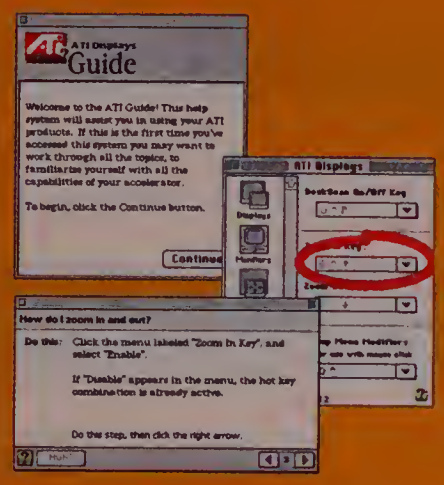
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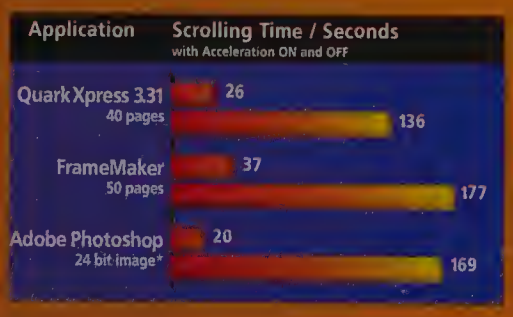
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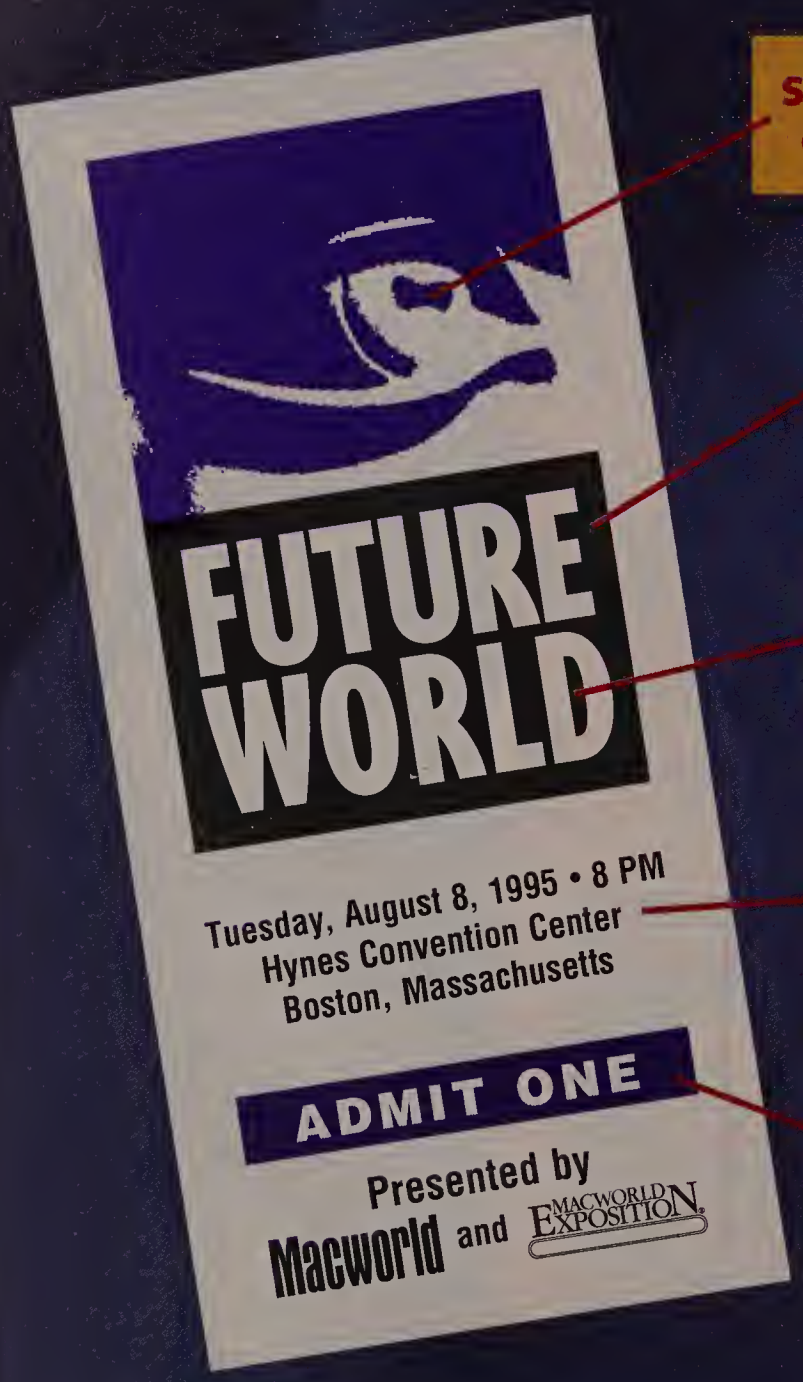
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SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

Selected and edited by Charles Barrett

The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in *Macworld*'s *Reviews* (products rated ★★ or lower are not eligible for inclusion), have been selected as an **Editors' Choice**, or have won a **World-Class** award. In some cases, the editorial evaluation quoted is for an earlier product version. The ◀ symbol indicates that the product is Power Mac related. Except where otherwise indicated, prices given are suggested retail prices.

When placing an order, please mention that you saw the offer in *Macworld*. Should any problems arise, contact the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the *Streetwise Shopper* editor with particulars.

BUNDLES

Apple MessagePad 120 + Notion + External Modem + PowerNews + NewtonMail + Pocket Quicken The following products, which have a retail value of over $200, are being bundled with the 2MB $699 version of Apple Computer's MessagePad 120—Eidetic's Notion: The List Manager, an external 2400-bps data and 9600-bps fax modem, one month of free usage for new subscribers to PenTekk Software Technologies' PowerNews news service, Apple's NewtonMail online communications system, and a coupon that entitles the buyer to a copy of Intuit's Pocket Quicken personal finance software. Call 800/909-0260 for product and reseller information.

Diamond Javelin Video 3000 Series + KPT Convolver 1.0 Diamond Multimedia Systems is including HSC Software's $199 Photoshop-compatible filter (Aug 95 ★★★★) with its 3000-series PCI-based Macintosh multimedia accelerators. The 3240XL ($399) and 3400XL ($569) models provide 2MB and 4MB of VRAM, respectively. Both support 16.7 million colors at resolutions as high as 1152 by 870. Call 800/468-5846 for more information.

Digital Chisel 1.2 + ◀ 5trata 5tudioPro 1.5 + ◀ Strata MediaPaint 1.0 + ◀ MiniCad 5 Academic Distributing is offering students, academic staff, and faculty a "virtual reality studio" bundle consisting of Pierian Spring Software's $199.95 Digital Chisel educational multimedia authoring tool (Jun 95 ★★★), Strata's $1495 high-end 3-D design application (Mar 94 ★★★★ for StudioPro 1.0) and $695 paint tool (Sep 95 ★★★★), plus Graphsoft's $795 CAD software (Nov 94 ★★★★), all for $795 (regularly priced at $1249 if purchased separately). Call 800/531-3227 for nearest authorized dealer. *Offer expires 9/30/95.*

Master CD Plus + Toast Pro MicroNet Technology is including Astarte GmbH's $649 Toast Pro authoring software with its $1895 double-speed CD recorder (Aug 95 ★★★ for Master CD Pro). Toast Pro supports hybrid and multisession standards. Call 714/453-6100 for more information.

◀ Open 5esame 1.1 + Managing Your Money 5.0 + The Diet Balancer + Mangia Charles River Analytics is including the following software free of charge with its $99 Finder-automation utility (May 94 ★★★ for Open Sesame 1.02): MECA Software's $69.95 personal financial software (Jan 93 ★★★★), Nutridata Software's $69.95 nutrition program (Dec 92 ★★★★ for The Diet Balancer 1.0), and Upstill Software's $49.95 Mangia electronic cookbook. This bundle is available only from Charles River Analytics (800/913-3535, ext. 526) for $39.94. *Offer expires 9/30/95.*

Thunder IV Accelerator + ColorComposer Radius is including a free copy of its $349 screen color adjuster with all 24-bit Thunder IV color graphics cards. ColorComposer modifies the display of screen images to match printer output and works with all color-management systems. Call 800/227-2795 for more information.

SIDEGRADES/UPGRADES

◀ Astound 2.0 for Power Macintosh Gold Disk is offering this $249.95 multimedia presentation software package (Nov 93 ★★★★ for version 1.0) for $99.95 to registered owners of Microsoft PowerPoint, Persuasion, Action, and Director. Call 800/465-3375 for more information.

◀ ClarisImpact 2.0 Claris is offering this $129 charting and diagramming application (Jun 94 ★★★★ for 680X0 version 1.0) for $69 to registered owners of other graphics products, FileMaker Pro, and ClarisWorks. Call 800/544-8554 for more information.

MacDraft 4.1 To promote MacDraft's ability to link to Excel, Innovative Data Design is offering a special price of $99 (SRP regularly $449) for its architectural/engineering design and drafting and technical-illustration program to all licensed users of Excel 4.0 or later. Call 510/680-6818 for more information and to order. *Offer expires 8/31/95.*

◀ PCI 5C5I JackHammer + Hard Disk ToolKit 1.7.5 or RAID ToolKit 1.7.5 FWB is offering owners of any NuBus or PDS SCSI accelerator card a trade-in upgrade to the $499 Hard Disk ToolKit bundle for $299, while owners of any NuBus or PDS SCSI accelerator-based disk array can upgrade to the $699 RAID ToolKit bundle for $499. Call 415/325-4392 for more information.

RAM Doubler 1.5.2 Connectix is offering this $99 RAM-enhancement utility (May 94 ★★★★ and Jun 94 "Virtual Memory Realities" Editors' Choice for version 1.0.1) to registered users of any other Connectix product for $49. Call 800/950-5880 for more information.

SPECIAL DISCOUNTS/OFFERS

AppWare 1.2 Novell is offering this $495 application development system on CD-ROM for $199. AppWare provides reusable software components, including those found in Reach Software's WorkMan for AppWare, which enhance the building of applications with workflow-tracking capabilities. Call 800/277-2717 for more information. *Offer expires 8/31/95.*

Calendar Manager 5.0 Russell Information Sciences, which has priced this new version of its cross-platform group-scheduling application at $995 for the first server, is offering additional servers at a 40 percent discount if ordered within 90 days of the initial purchase. Call 714/362-4000 for more information.

Claris Organizer 1.0 Claris is offering this $99 personal information organizer (Jan 95 ★★★) for a suggested promotional price of $49. Call 800/325-2747 for more information. *Offer expires 12/31/95.*

◀ Contact Ease Enterprise WestWare is offering this $550-per-user client-server sales-automation system for $179 per user to customers who purchase a $75-per-user annual maintenance contract. The system lets users connect with an Omnis 7 database server or any corporate SQL, Sybase, or Oracle database. Call 800/869-0871 for more information. *Offer expires 9/30/95.*

Envoy Viewer Novell is offering a free copy of this platform- and application-independent document viewer on its Internet home page (**http://www.novell.com**). The viewer permits reader feedback, but not document distribution. The complete $189 Envoy package's publisher distributes the viewer with documents, allowing recipients to see original layouts, fonts, graphics, and colors. It also provides document thumbnails and permits annotations.

◀ FreeHand 5.0 5oftware Developer's Kit Macromedia is offering this SDK as a free download from both AOL (keyword **Macromedia**) and CompuServe (go **Macromedia**).

Poser 1.0 Fractal Design is offering this $199 program for modeling human forms for an introductory price of $99. Poser models are exportable in several different formats for use with paint, illustration, and rendering applications. Call 800/297-2665 for more information. *Offer expires 8/31/95.*

◀ Web5pace Nonsupported beta versions of Template Graphics Software's $49 World Wide Web 3-D viewing tool, which supports Silicon Graphics' standard Virtual Reality Modeling Language, will be available free of charge by this fall. WebSpace, which does not require QuickDraw 3D, works in concert with Web browsers, including those from Netscape Communications and Spyglass. Online users can download the software from several public File Transfer Protocol sites on the Web, including those from Silicon Graphics (**http://www.sgi.com**) and Template Graphics (**http://www.sd.tgs.com/~template**). m

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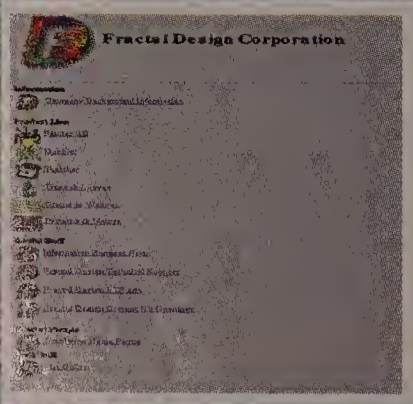
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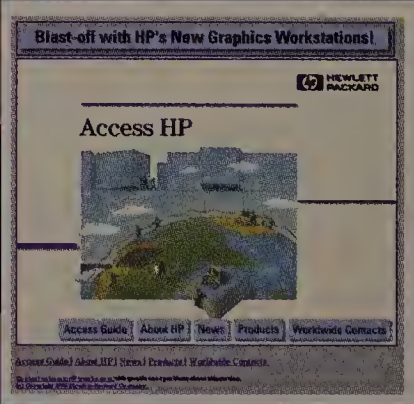
Fractal Design Corporation



Fractal Design Corporation's mission is to be a major force in multi-platform graphic software, creating and marketing next generation paint, photo design and image processing software for the Apple Macintosh and Microsoft Windows platforms.

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Macromedia



Macromedia's WWW site is a 'must see' for graphic design and multimedia enthusiasts. From the leader in multimedia and digital arts software for Windows and Macintosh, get comprehensive product information, tips and tricks from leading developers, visit the interactive gallery, and read hot content from New Media Magazine, The Red Herring, Multimedia Producer, Morph's Outpost and more!

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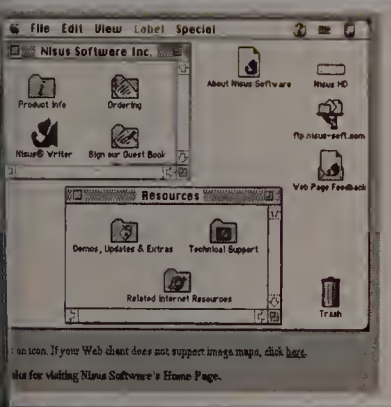
NEC Technologies



Thousands of Internet surfers have visited the NEC USA World Wide Web site, launched April 1995. The site offers in-depth information about the full line of NEC products, including Macintosh-compatible MultiSync®monitors, MultiSpin® CD-ROM drives and SuperScript™ printers.

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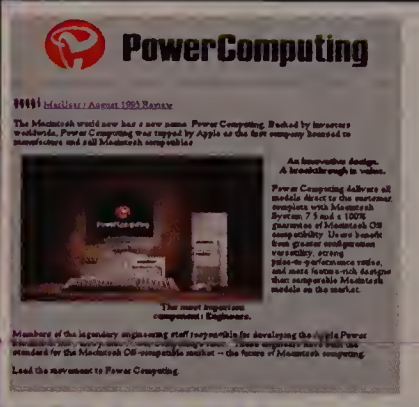
Nisus Technologies



Nisus® Software Inc. was founded in 1984 to develop and publish high quality Macintosh software for business, school and home. Best known for its award winning multilingual Nisus® Writer word processor, the company distributes its products worldwide. Nisus Writer has been localized for many languages, including Roman, Asian, Right-to-Left and Cyrillic.

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Power Computing



The Macintosh world now has a new name:Power Computing. Backed by investors worldwide, Power Computing was tapped by Apple as the first company licensed to manufacture and sell Macintosh compatibles. Power Computing delivers all models direct to the customer, complete with Macintosh System 7.5 and a 100% guarantee of Macintosh OS compatibility.

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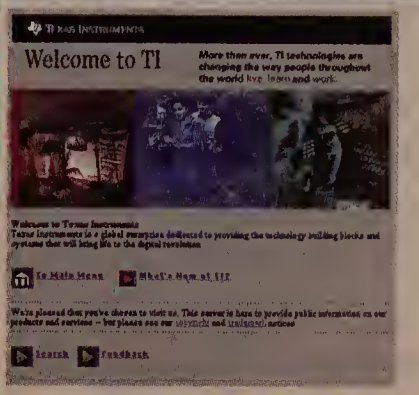
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Texas Instruments



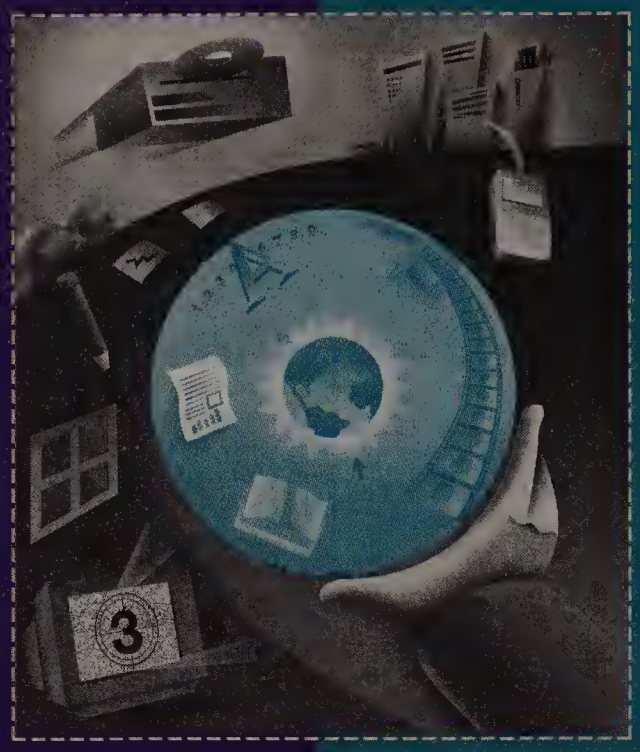
Texas Instruments web site features technology building blocks that will bring life to the digital revolution. Of special interest to the Macintosh community, TI's product pages include the full range of Mac-compatible printers. TI's other selections feature information on notebook computers, calculators, semiconductors, as well as a wide range of company information and employment opportunities.

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18	Claris Corporation	—	—
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153	CompuServe	66	800/848-8199
51	Computer City	240	800/THE CITY
219-222	Computer Discount Warehouse	2	800/861-4CDW
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For faster results just fax this sheet to +1-413-637-4343. Please indicate your fax number where indicated.

Please answer these questions so that we may better serve you.

A. Including yourself, approximately how many people are employed at your entire work-site (i.e., employees in your office, building, or cluster of buildings)? (Check one.)

- 01 ❑ 1000+
- 02 ❑ 999 - 100
- 03 ❑ 99 - 25
- 04 ❑ Under 25

B. Which of the following computers are installed at this entire work-site? (Check all that apply.)

- 05 ❑ Apple Workgroup Servers/ Mac Quadra-series
- 06 ❑ Mac Centris-series/II-series/LC III/ Performa 600/450/SE 30
- 07 ❑ Mac LC/LC II/Performa 430/405/ 400/200/Classic-series/SE/Plus/ 512K/128K/Portable
- 08 ❑ Mac PowerBook-series/Duo-series

C. What is the total number of Macs installed at this entire work-site? (Check one.)

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/ or services? (Check one.)

	C	D
500+	❑ 09	❑ 15
499 - 100	❑ 10	❑ 16
99 - 50	❑ 11	❑ 17
49 - 10	❑ 12	❑ 18
9 - 1	❑ 13	❑ 19
None	❑ 14	❑ 20

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)

- 21 ❑ Initiate/Determine need for product/capabilities/features
- 22 ❑ Evaluate, recommend, or approve brands/models
- 23 ❑ Evaluate, recommend, or approve purchase source
- 24 ❑ Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)

- 25 ❑ $1 million or more
- 26 ❑ $999,999 – $500,000
- 27 ❑ $499,999 – $100,000
- 28 ❑ $99,999 – $50,000
- 29 ❑ $49,999 – $10,000
- 30 ❑ Under $10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)

- 31 ❑ Business software (Word processing, spreadsheet, database, etc.)
- 32 ❑ Graphics/publishing software
- 33 ❑ Monitors/displays
- 34 ❑ Printers/scanners
- 35 ❑ Networking/communications hardware and/or software
- 36 ❑ Multimedia/AV hardware and/or software
- 37 ❑ Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function? (Check one.)

- 38 ❑ Computer Reseller/VAR/VAD
- 39 ❑ MIS/DP/IS/Network Management
- 40 ❑ Engineering
- 41 ❑ R&D/Scientific
- 42 ❑ Corporate/General Management
- 43 ❑ Accounting/Finance
- 44 ❑ Marketing/Sales/PR/ Communications
- 45 ❑ Art/Design/Creative Services

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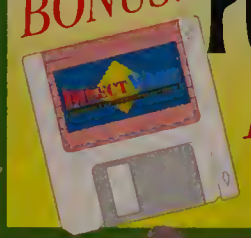
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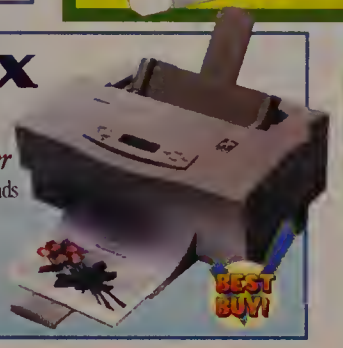
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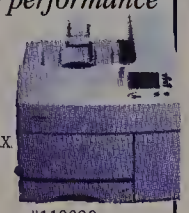
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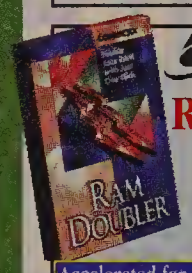


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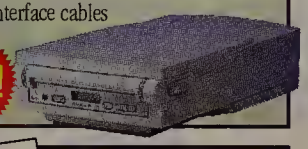
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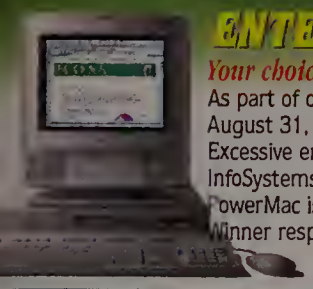
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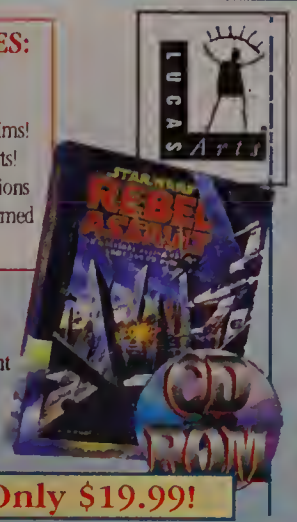
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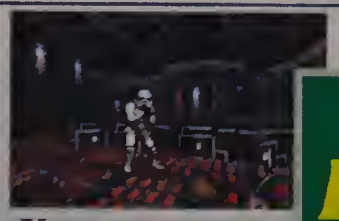
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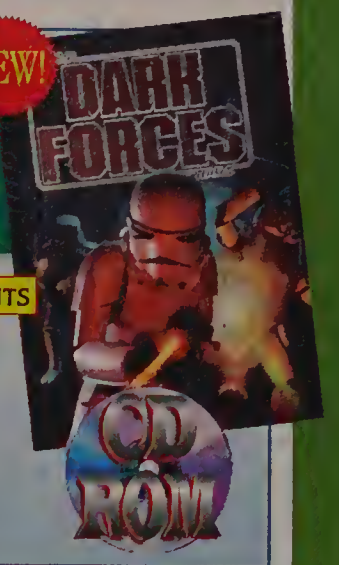
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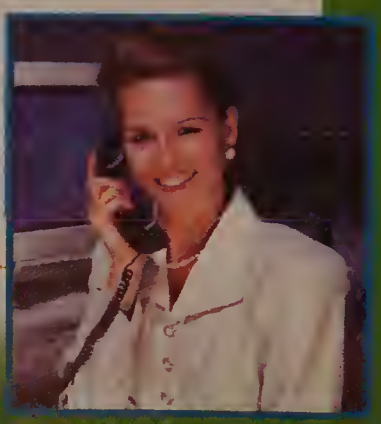
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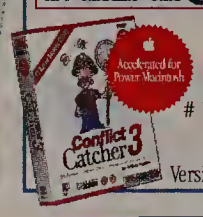
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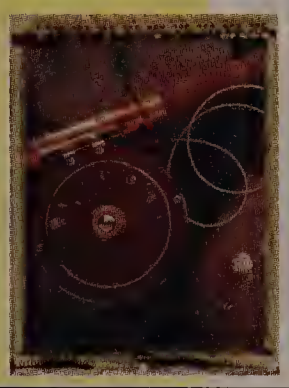
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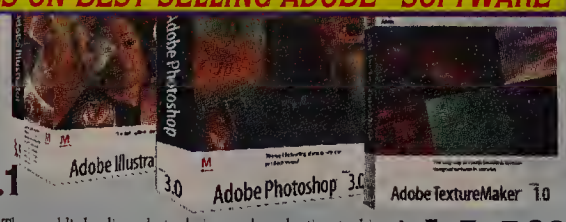
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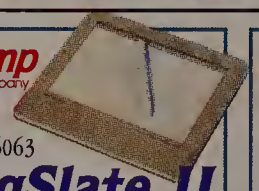
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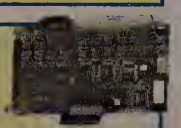
$209.99 # 146063

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Drawing Slate II & Painter 3.1 #146066 $449.99

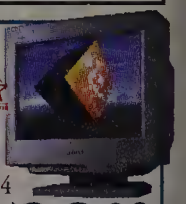
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5 YEAR WARRANTY

ND/MODEL	CAPACITY	SIZE	ACCESS	RPM	INTERNAL	EXTERNAL
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**	730MB	3.5"	11MS	4090	$ 239	$ 299
NER CFP1080S	1.2GIG	3.5" LP	9MS	5400	$ 455	$ 515
chi DK326c-10	1.0GIG	3.5"	9MS	6300	$ 535	$ 595
TSU M1606s	1.2GIG	3.5" LP	10MS	5400	$ 415	$ 475
gate ST31230N	1.2GIG	3.5" LP	9MS	5400	$ 585	$ 645

7GIG - 9GIG

5 YEAR WARRANTY

ND/MODEL	CAPACITY	SIZE	ACCESS	RPM	INTERNAL	EXTERNAL
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ner CFP2105S	2.1GIG	3.5" LP	9MS	5400	$ 835	$ 895
ner CFP2107S	2.1GIG	3.5" LP	8MS	7200	$ 955	$ 1015
ntum XP32150S	2.2GIG	3.5" LP	8.6MS	7200	$ 935	$ 995
gate Barracuda	2.5GIG	3.5" LP	8MS	7200	$ 1055	$ 1115
gate BarracudaW	2.5GIG	3.5" LP	8MS	7200	$ 1139	$ 1199
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ntum XP34280S	4.3GIG	3.5"	8.6MS	7200	$ 1295	$ 1355
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1.3GB	Ricoh Turbo	$ 2175
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1.3-4GIG	DC DOUBLE DAT	4MM	$ 839	$ 899
4.0GIG	Sony 5200 DDS-2	4MM	$ 939	$ 999
4.0-8GIG	Sony 5000 DDS-2	4MM	$ 939	$ 999
7.0-14GIG	Exabyte 8505XL	8MM	$ 2135	$ 2195
-32GIG	Conner Autoloader	4MM		$ 2475
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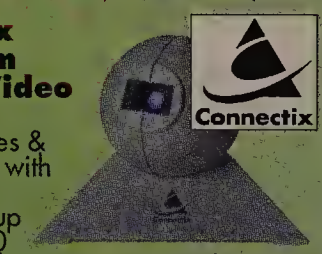
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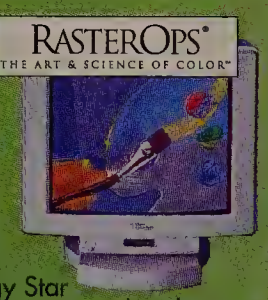


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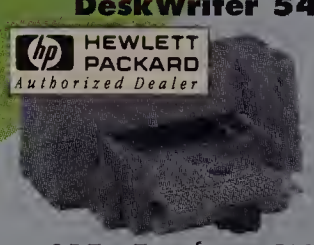
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Reference

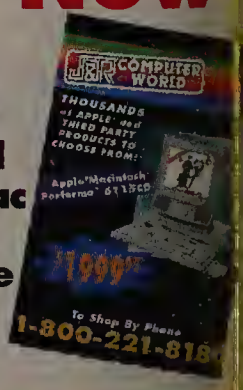
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Plextor	6Plex	$649
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Model	Capacity	Trans.Rate	Media	Price(Ext)
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1.3 GB	Tahiti III	18ms	2335	2395

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UMAX	UC630/1260	675/1240
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Lightning	365 MB	11 ms	4500	128K	2 Year	145	205
Trailblazer	420 MB	11 ms	4500	128K	3 Year	175	235
DSP3053	535 MB	9.5 ms	5400	512K	5 Year	220	280
Fireball	540 MB	10 ms	5400	128K	3Year	210	270
Lightning	730 MB	11 ms	4500	128K	2 Year	245	305
Trailblazer	850 MB	11 ms	4500	128K	3 Year	270	330
Fireball	1080 MB	10 ms	5400	128K	3 Year	425	485
Atlas	2.1 GB	8 ms	7200	1024K	5 Year	920	990
Capella	2.1 GB	8 ms	5400	1024K	5 Year	895	955
Grand Pnx	4200 MB	8.6 ms	7200	512K	5 Year	1095	1155
Atlas	4.3 GB	8 ms	7200	1024K	5 Year	1495	1555

	Capacity	Size	Access	Cache	Warranty	Int.	Ext.
Daytona	256 MB	2.5"	17ms	128K	1 Year	240	340
Daytona	341 MB	2.5"	17ms	128K	1 Year	295	395
Daytona	514 MB	2.5"	14ms	128K	1 Year	415	515

MICROPOLIS MICROPOLIS

	Capacity	Seek	RPM	Cache	Warranty	Int.	Ext.
M4221	2.1 GB	8.5 ms	7200	512K	5 Year	895	955
M1936	3.6 GB	11 ms	5400	512K	5 Year	1225	1325
M3243	4.3 GB	8.5 ms	7200	512K	5 Year	1325	1385
M1991	9.0 GB	11 ms	5400	512K	5 Year	2150	2250
M4221W	2.1 GB	8.5 ms	7200	512K	5 Year	1025	1085
M3243W	4.3 GB	8.5 ms	7200	512K	5 Year	1435	1495
M1991W	9.0 GB	11 ms	5400	512K	5 Year	2250	2350
M4221AV	2.1 GB	8.5 ms	7200	512K	5 Year	955	1015
M1936AV	3.6 GB	11 ms	5400	512K	5 Year	1275	1375
M3243AV	4.3 GB	8.5 ms	7200	512K	5 Year	1375	1470
M1991AV	9.0 GB	11 ms	5400	512K	5 Year	2260	2360
M4221WAV	2.1 GB	8.5 ms	7200	512K	5 Year	1075	1135
M3243WAV	4.3 GB	8.5 ms	7200	512K	5 Year	1525	1585
M1991WAV	9.0 GB	11 ms	5400	512K	5 Year	2365	2465

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Micropolis 2.1GB ..... ***Int. $895 Ext. $955***
M4221, 7200 RPM, 9 ms seek, 512K cache, 5 year warranty

Seagate 4.0GB ..... ***Int. $1450 Ext. $1510***
ST15150N, 7200 RPM, 8.5 ms seek, 1024K cache, 5 year warranty

Seagate Seagate Seagate Seagate

	Capacity		Seek	RPM	Cache	Warranty	Int.	Ext.
Hawk 2LP	1.2 GB	ST31230N	9.5ms	5400	512K	5 Year	$525	$585
Hawk 4	4.2 GB	ST15230N	9ms	5400	512K	5 Year	1265	1325
Barracuda	2.4 GB	ST32550N	8ms	7200	1024K	5 Year	995	1055
Barracuda	4.2 GB	ST15150N	8ms	7200	1024K	5 Year	1450	1510
Barracuda	2.4 GB	ST32550W	8ms	7200	1024K	5 Year	1125	1195
Barracuda	4.2 GB	ST15150W	8ms	7200	1024K	5 Year	1575	1635
Elite	9.0 GB	ST410800N	11ms	5400	1024K	5 Year	2540	2640

FUJITSU FUJITSU FUJITSU FUJITSU FUJITSU

	Capacity	Seek	RPM	Cache	Warranty	Int.	Ext.
M2684	530 MB	10ms	5400	512K	3 Year	220	280
M1606	1.2 GB	10ms	5400	512K	3 Year	495	555
M2915	2.1 GB	10ms	5400	512K	3 Year	945	995

Removable Storage

SyQuest

Capacity	Seek	RPM	Int.	Ext.
88 MB SQ5110C	20ms	3200	285	345
200 MB SQ5200	18 ms	3200	405	465
270 MB SQ3270	13.5ms	3200	405	465

2 Year Warranty on all SyQuest Drives
SyQuest drives come complete with a cartridge (Formatted or Unformatted) and the latest SCSI 4.3 compatible software.

SyQuest Media

Capacity	Model	Warranty	Price
44 MB	SQ400	5 year	$41
88 MB	SQ800	5 year	47
105 MB	SQ310	5 year	53
200 MB	SQ2000	5 year	75
270 MB	SQ327	5 year	63

SCSI-2 Accelerators

Atto

Silicon Express Fast SCSI-2 525
SCSI 1 & 2 support transfer rates up to 10.0 MB/sec ,supports multiple block sizes,takes advantage of parallel processing capability.Ideal for graphic design, multimedia applications and More!

Silicon Express 4 895
Fast/Wide 16BIT SCSI 2 accelerator card for Apple's Nubus based computers Supports fast/wide SCSI 2 (16 Bit) transfer rates up to 20MB/sec. and fast SCSI 2 (8 Bit) transfer rates up to 10 MB/sec. Full 16 Bit wide support for the latest drives and disk arrays. Fully compatible with all existing SCSI 1 drives Formatting software is included.5 Year Warranty.

Remus RAID Software Call

Tape Backup Drives

HEWLETT PACKARD

2.0 GB	835	885
HP35470, 15MB/min., 4mm media, 1 Year warranty		
3-5 GB	995	1055
HP35480, 45MB/min., 4mm media, 1 Year warranty		
4-10 GB	1225	1285
HP1533, 60MB/min., 4mm media, 1 Year warranty		
20-50 GB Auto Tape Loader	3195	3295
HP1553, 60MB/min., 4mm media, 1 Year warranty		

Exabyte

2-5 GB	1425	1495
8205XL, 263KB/sec., 8mm media, 1 Year warranty		
7-14 GB	2200	2270
8505XL, 500KB/sec, 8mm media, 1 Year warranty		

All tape backup drives include 1 piece of media and Retrospect backup software.

Memory Products

Always call for the most competitive pricing on memory!

Memory	Centris & Quadra
2x8x80	4MB 60/70ns
4x8x80 60/70ns	8MB 60/70ns
4x8x80FX	16MB 70ns
16x8x80 LowProfile	32MB 60ns
16x8x80 FX	VRAM 256K/512K

Powerbook Memory
520,520c,540,540c
4MB,8MB,16MB,32MB
140,170,160,165c,180,180c,Duos
4MB,6MB,8MB,10MB
12MB,14MB,20MB

Lifetime warranty on all memory products!!!

ProDirect, Inc. 6824 Washington Ave. South Eden Prairie, MN 55344

Circle 135 on reader service card

1-800-258-2622 1-800-CLUBMAC

CLUBMAC REMOVABLE STORAGE

CLUBMAC IS DOING IT AGAIN!

Once again, the first 1000 ClubMac SyQuest 200MB External SubSystems sold will include TWO 200MB Genuine SyQuest cartridges. SAVE $76!

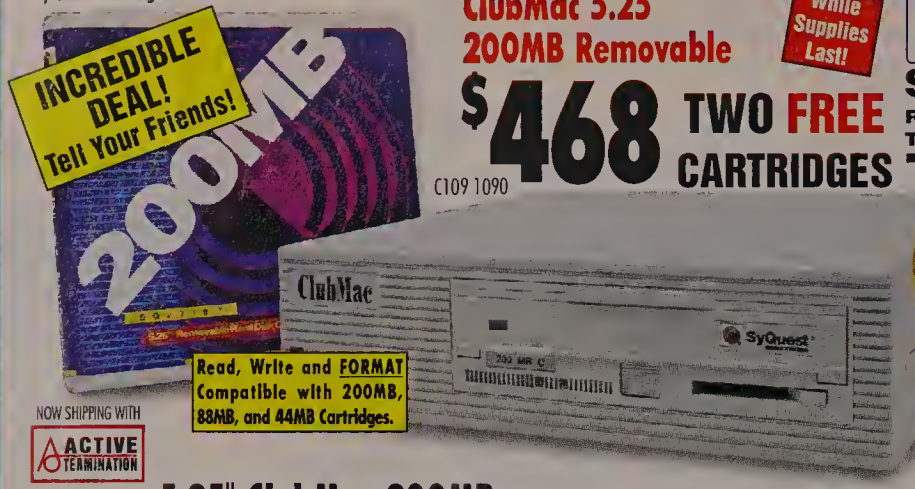
FEATURING SyQuest® REMOVABLE TECHNOLOGY

ClubMac 5.25" 200MB Removable — While Supplies Last!

$468 TWO FREE CARTRIDGES

C109 1090

INCREDIBLE DEAL! Tell Your Friends!



Read, Write and FORMAT Compatible with 200MB, 88MB, and 44MB Cartridges.

NOW SHIPPING WITH ACTIVE TERMINATION

30 DAY

MacUser ★★★★ February 1995

C109 1090 **5.25" ClubMac 200MB** *includes Two FREE Formatted 200MB Cartridge (Limited Supply)* $468

C109 1002 **5.25" ClubMac 88MB** *includes FREE Formatted 88MB Cartridge* $349

All SyQuest drives include SCSI Director formatting software, ONE FREE Formatted Cartridge, necessary cables for "plug-and-play" and documentation. All SyQuest drives include a 30-Day Money Back Guarantee and TWO Year Warranty. All SyQuest cartridges include a FIVE Year Warranty (warranty after the first year is handled by SyQuest).

ZIP KILLER

ClubMac 3.5" 105MB Removable

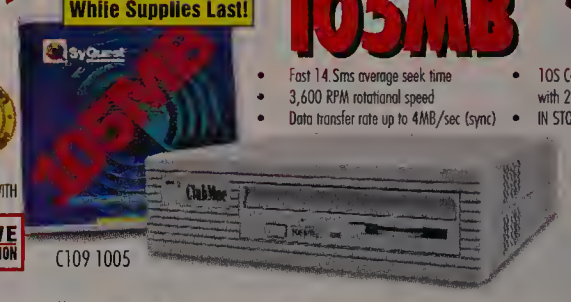
105MB $199

- Fast 14.5ms average seek time
- 3,600 RPM rotational speed
- Data transfer rate up to 4MB/sec (sync)
- 105 Cartridge is compatible with 270 SyQuest Drive
- IN STOCK NOW!

White Supplies Last!

30 DAY

NOW SHIPPING WITH ACTIVE TERMINATION



C109 1005

FREE CARTRIDG

C109 1005 **3.5" ClubMac 105MB** *includes FREE Formatted 105MB Cartridge* $199

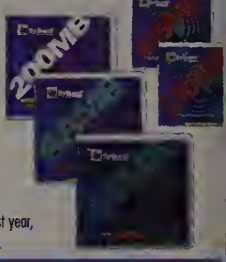
C109 1004 **3.5" ClubMac 270MB** *includes FREE Formatted 270MB Cartridge* $468

GENUINE SYQUEST CARTRIDGES

Part Number	Media	Qty 1	Qty 10	Qty 20
S198 1010	44MB	$43ea	$42ea	$41ea
S198 1011	88MB	$48ea	$47ea	$46ea
S198 1012	200MB	$76ea	$74ea	$72ea
S198 1013	105MB	$51ea	$50ea	$49ea
S198 1014	270MB	$62ea	$61ea	$60ea

SyQuest 5 YEAR Warranty* ON CARTRIDGES

* Warranty after first year, handled by SyQuest.

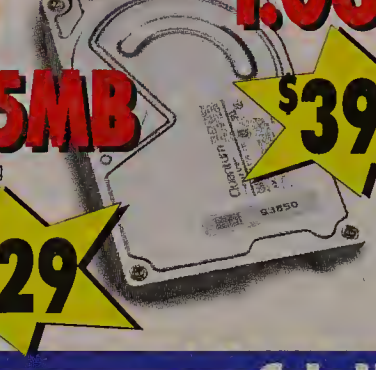


CLUBMAC HARD DRIVE STORAGE

30 DAY

1.0GB

365MB Internal Lightning C109 1155 $129



$399 Internal Fireball C109 1202

NOW SHIPPING WITH ACTIVE TERMINATION

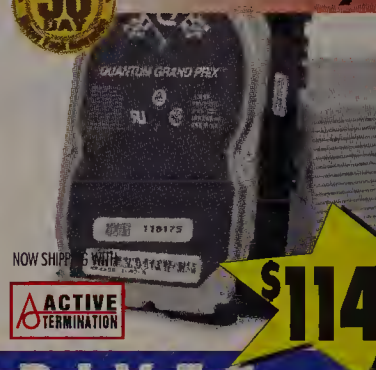
Quantum

	Part No.	Internal	Part No.	External
365MB Lightning 11ms	C109 11S0	$129	C109 1100	$189
540MB Maverick 14ms	C109 11S1	$189	C109 1101	$249
540MB Fireball 12ms	C109 1200	$199	C109 1201	$259
730MB Lightning 11ms	C109 11S4	$229	C109 1102	$289
1080MB Fireball 12ms	C109 1202	$399	C109 1203	$459
2200MB Capella 8.5ms	C109 1213	$799	C109 1212	$859
4300MB Grand Prix 8.6ms	C109 11S9	$1149	C109 110B	$1209

30 DAY

Incredibly Low Price

4.3GB 7200 RPM



NOW SHIPPING WITH ACTIVE TERMINATION

$1149

Internal Grand P C109 1108

CLUBMAC CD-ROM DRIVES

ClubMac 2X CD-ROM

- 300KB/sec data transfer rate
- 350ms average access time
- Flip Top Lid
- LED light, headphone jack
- Volume control
- Light weight
- CharisMac's CD AutoCache driver software
- ONE Year Warranty

ClubMac NEW PRODUCT



$99

C109 9550

30 DAY

CLUBMAC CD-ROM BUNDLE $100

CD-ROM BUNDLE

- Grolier 1995 Multimedia Encyclopedia
- U.S. Atlas & World Atlas
- San Diego Zoo Animals
- Wyatt Earp
- QuickShot speakers & Koss Headphones (5 Titles/4 CDs)



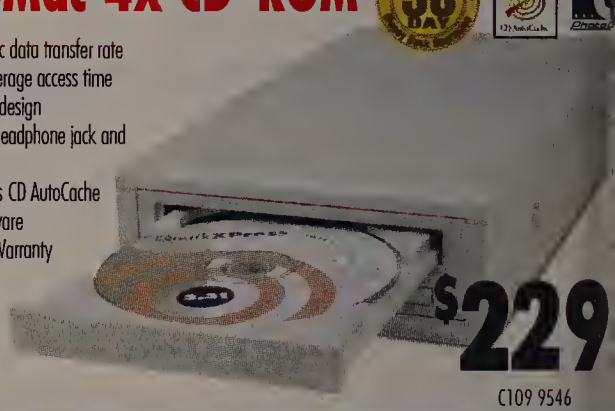
C109 9546

* with any CD-ROM Drive purchase

ClubMac 4X CD-ROM

30 DAY

- 600KB/sec data transfer rate
- 190ms average access time
- Caddy-less design
- LED light, headphone jack and RCA jacks
- CharisMac's CD AutoCache driver software
- ONE Year Warranty



$229

C109 9546

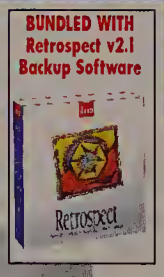
DAT AND OPTICAL STORAGE DEVICES

ClubMac Tape Backup Drives

C109 5011 $699

30 DAY

BUNDLED WITH Retrospect v2.1 Backup Software

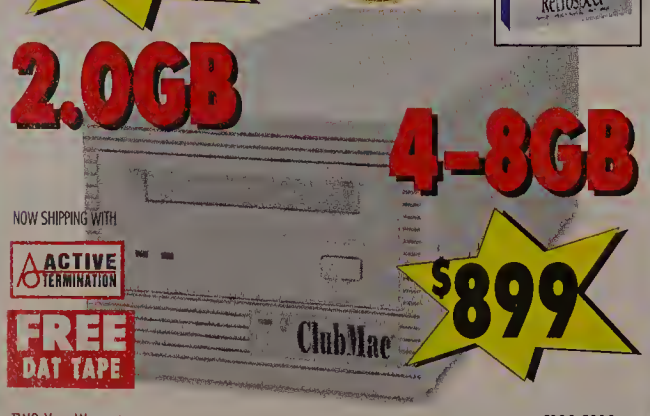


2.0GB 4-8GB

$899

NOW SHIPPING WITH ACTIVE TERMINATION

FREE DAT TAPE



TWO Year Warranty

C109 5010

ClubMac 5.25" Optical

FREE CARTRIDGE

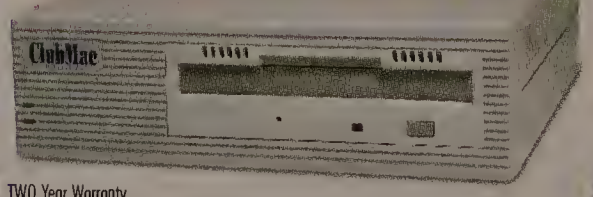
- 5.25" Olympus Optical Mechanism
- 29ms ave. seek time
- 3,500 RPM rotational speed

30 DAY

NOW SHIPPING WITH ACTIVE TERMINATION

C109 5022 $1499

1.3GB



TWO Year Warranty

ClubMac 3.5" Optical

MacUser ★★★★ February 199

- 3.5" Olympus Optical Mechanism
- 28ms overage seek time
- 4,200 RPM rotational speed

30 DAY

$579

230MB

C109 5020

FREE CARTRIDGE



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TWO Year Warranty



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- Manage information, stay in touch with people, and exchange data with your computer
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- Newton Recognition Architecture recognizes both printed and cursive handwriting
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- Features a fast 20 MHz Processor, improved 4mb ROM and 640K RAM.

$159.95



A102 1211

Now Bundled with Money Magazine Business Forms



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MONITORS & GRAPHIC CARDS

21" MultiSync XE21

21" diagonal flat square technology
13.8" Viewable image size
Mac Res:
640 x 480 NI
1024 x 768 NI
Fine 0.28mm dot pitch
Monitor Manager
AccuColor, Digitol controls
Energy star compliant for true energy savings

21"



$1829

21" XE21 (N026 1010) $1829
21" XP21 (N026 1011) 2199

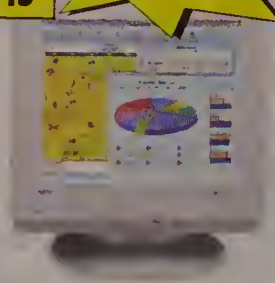
15" MultiSync XV15

Outstanding performance at an affordable price

- Larger sharper images that are easier to use
- Plug and Polay compatible for real performance advantoges
- Energy star compliant for true energy savings
- 15" diagonal flat square technology
- 13.8" Viewable image size
- Mac Res: 1024 x 768 NI
- Fine 0.28mm dot pitch

15"

$435



14" XV14 (N026 1016) $319
15" XV15 (N026 1015) $435
15" XE15 (N026 1006) $549
15" XP15 (N026 1005) $599

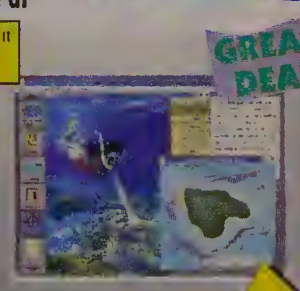
17" MultiSync XV17

Large Screen performance at an affordable price

- Perfect entry level business, small office/home office, home ducation/entertainment
- 17" diagonal flat square display
- 15.6" Viewable image size
- Mac Res: 1024 x 768 NI
- PC Res: 1280 x 1024 NI
- Fine 0.28mm dot pitch
- FullScan capability
- On-Screen Manager

17"

GREAT DEAL



$759

17" XV17 (N026 1022) .. $759
17" XP17 (N026 1009) $1049

IntelliColor Display/20e

The Radius IntelliColor Display/20e is part of the next generation in professional two-page color displays. It delivers unrivaled command of your desktop, from on-the-fly resolution switching to state-of-the-art color temperature control. Combined with Radius' IntelliColor software, it allows you to emulate 3 lighting conditions and user-adjustable color temperature, so you get more accurate color representation.

$1979



R016 1013 **PressView 21T Display System** (PV2102) 21" Trinitron, 640 x 480 to 1600 x 1200 ..... $3129
R016 1016 **SuperMatch 21•T XL Trinitron** (STD2102) 21" Trinitron, 1600 x 1200 ..... $2139
R016 1009 **IntelliColor Display/20e** (0461) 20" Trinitron, 640 x 480 to 1600 x 1200 ..... $1979
R016 1007 **PrecisionColor Display/17** (0460) 17" Trinitron, 640 x 480 to 1600 x 1200 ..... $959
R016 1030 **PrecisionView 17** (RD1705) 17" Trinitron, 1024 x 769 ..... $899

VideoVision Studio 2.0

With JPEG hardware compression and decompression for full-screen, full-motion recording and playback from a hard disk, VideoVision Studio combines the power and flexibility of the Macintosh with the ease and transportability of video tape.

$3699



R013 1018 **VideoVision Studio 2.0** (0500) Compatible with the PowerMac 8100 ..... $3699
R013 1020 **VideoVision Studio 2.0** Upgrade (0505) JPEG daughtercard $1759
R013 1026 **SpigotPower AV** (OV1630) Captures full-screen 24-bit color video up to 30 frames/60 fields per sec $759
R013 1065 **SpigotPro AV** (0514) captures full-screen 24-bit color video up to 30 frames/60 fields per sec $1249

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Super Resolution at Earth-Shaking Speed. radius

Thunder Series Cards Blow the doors off Power Mac



as low as **$759**

FREE* ColorComposer software

Adobe charged

Three Thunder IV GX cards extend the 24-bit resolution of the PowerMac's built-in video. Accelerated 24-bit color, built-in Photoshop acceleration, CMYK acceleration, hot-key resolution switching, pan and zoom, color composer and 10-bit DAC add up to make these cards the number one choice for image processing, compositing and illustration.

Quadra 9500 Compatible PCI Cards Best Seller

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R013 1072 **ThunderColor 30/1152** (0531) 24-bit support 1152 x 870 ..... $1599

R013 1059 **Thunder IV GX•1600** (0513) 24-bit support to 1600 x 1200 ..... $2799
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R013 1061 **Thunder IV GX•1152** (0485) 24-bit support 1152 x 870 ..... $1899
R013 1062 **Thunder 24 GT** (0491) 24-bit support to 1152 x 870, PhotoEngine optional $1329
R013 1008 **PrecisionColor Pro 24X** (0429) 24-bit color, 640 x 480 to 1152 x 870, 13" to 21" $1059
R013 1010 **PrecisionColor Pro 24XK** (0430) 24-bit color, 1024 x 768, 16" and larger displays. $749

* For a limited time, FREE ColorComposer software is included with each Thunder Series card

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HIGH DETAIL 4800 DPI, 30-BIT COLOR SCANNING MADE AFFORDABLE.

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Increased image quality with 30-bit color scanning

MACUSER EDITORS' CHOICE 1994 WINNER

Epson ES-1200 Pro Mac Scanning System

$1269



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Now you can print in vivid color with clarity never before possible in a personal color printer. At 360 dpi resolution blacks are blacker and at 720/360 dpi the color output is the sharpest available.

- Incredible 720 dpi color printing, optimized with special coated paper
- 360 dpi black print resolution
- Prints up to 16 million colors
- Serial interface
- Includes Mac driver software and a TWO Year Warranty

MACWORLD MW ★★★★

MACUSER EDITORS' CHOICE 1994 FINALIST

Stylus COLOR Inkjet Printer

E047 1012

$529



ACCELERATORS

IN STOCK!

DAYSTAR DIGITAL

100 MHz turbo 601



$1589

Compatible with Mac IIci, IIsi, IIvx, and Performa 600

The Turbo 601 provides the best of both worlds. The Turbo 601 allows you to run your current software up to twice as fast, and it lets your run powerPC accelleroted applications at full PowerPC speed - from 7 to 11 times faster!

DayStar 100 MHz Turbo 601 ..... $1589
Compatible with Mac IIci (D040 1048), IIsi (0040 1050), IIvx/vi/Performa 600 (0040 1052)

DayStar 100 MHz PowerPro 601 (D040 1043) $1589
Compatible with Quadra 900/950, 700 and other with Quadra style PDS

DayStar 66 MHz Turbo 601 ..... $989
Compatible with Mac IIci (D040 1039), IIsi (D040 1049), IIvx/vi/Performa 600 (0040 1051)

DayStar 66 MHz PowerCard 601 (D040 1040) $635

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$229

G050 1016

GLOBAL VILLAGE COMMUNICATION

Global Village TelePort Platinum

The Teleport Platinum 28.8 BPS fax/modem makes it easy to achieve the highest possible performance for both data adn fax communication. You'll save time and money when your use it to send and receive faxes, access your office network from home, transfer files, and connect to on-line services

PaperPort VISIONEER

The first truly simple, super-small input device that converts your paper documents into electronic anes. With PaperPort's direct links to word processors, OCR software (included!), printers and fax modems, you can file, edit, annotate, print and send your documents directly to others. (V025 1002)

$359



MACWORLD MW ★★★★★

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Circle 96 on reader service card

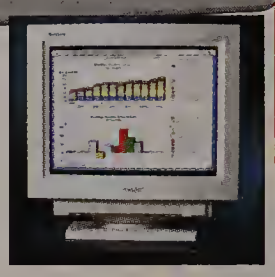
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- Unmatched quality and versatility!
- Advanced Trinitron technology for crisp, high-resolution images with an 832x624 maximum resolution
- .25mm aperture grid; 75Hz refresh rate
- An affordable monitor for everything from business software to CAD/CAM applications

Sony #01177



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Fujitsu DynaMO™ 230 Magneto-Optical Drive

- The ideal solution for anyone who needs a reliable way to store, transport and archive large data files
- 30ms average seek time; 2.1MB/sec data transfer rate
- Uses ISO standard 230MB and 128MB 3.5" MO cartridges (average life: 30 years)
- Media costs half the price of SyQuest cartridges!

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- Turn your PowerBook 1XX Series computer into a mobile office!
- 28,800 bps data speed; 14,400bps send/receive fax
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- Features fax/Apple Remote Access (ARA) incoming call recognition

Global Village #01167

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03971	Streamline V3.1	$121.98
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98501	SitCom	$61.98
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ASD

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Avid

98489	Elastic Reality for Power Mac	$224.98

Caere

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93424	ClarisWorks V4.0	$117.98
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Call	Corel Professional Photo CD's - Call	$18.98
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02586	Retrospect V2.1	$134.98
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17271	Intermission Screen Saver	$27.98
97938	Dpus & 8ill Screen Saver	$27.98

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97780	DeltaGraph Pro 3.5 Comp. Upgr.	$74.98

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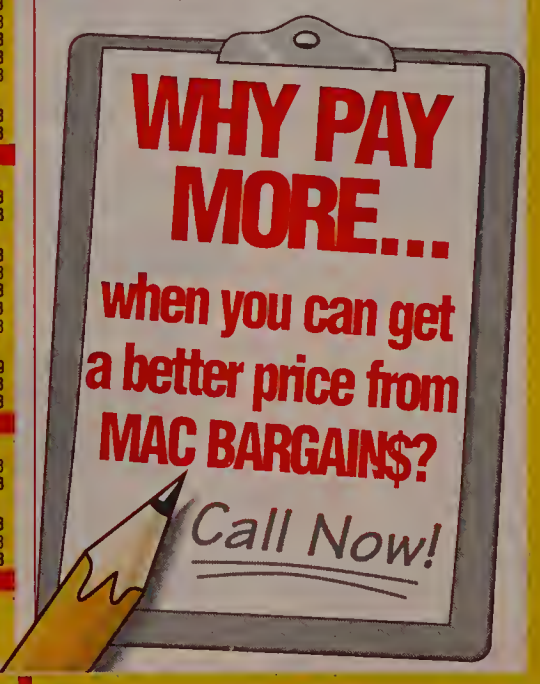


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8100/80 Superstation

0 Down! $228 per month

CPU Starting at $2599

$7.49 A Day!

- PowerPC 8100/80MHZ
- Internal CD ROM
- 40MB RAM
- 2.1GB internal hard drive
- Extended keyboard
- Apple 17" Trinitron monitor
- Radius Thunder 24 video card
- dsc 12000c, 9600x9600 dpi color flatbed scanner
- TI MicroLaser PowerPro, 600 dpi, 8.5" x 11" 12 ppm printer w/ 2 AppleTalk connectors
- Wacom 12x12 Graphics Tablet
- SuperMicro Extended Services

72 Hour Replacement Guarantee

8100/100 Video Workstation

0 Down! $452 per month

CPU Starting at $3199

$14.86 A Day!

- PowerPC 8100/100MHZ
- Internal CD ROM
- 72MB RAM
- 2.1GB internal hard drive
- Extended keyboard
- Radius 21" Trinitron monitor
- Radius Thunder 24 video card
- Radius Video Vision Studio Pro Pak including 4.0GB Fast&Wide disk array w/ Fast&Wide SCSI controller
- Internal SDT-5000 DAT tape drive w/ 1 FREE tape
- SuperMicro Extended Services

8100/110 Ultimate Graphics Workstation

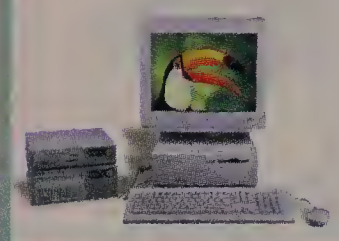
0 Down! $656 per month

CPU Starting at $4199

$21.56 A Day!

- PowerPC 8100/110MHZ
- Internal CD ROM
- 136MB RAM
- 4.0GB internal hard drive
- Sony 20SE Trinitron monitor
- Radius Thunder IIGX 1600
- Multifunctional SyQuest 200 /Sony 650 optical w/ SyQuest 200 cartridge, 650MB optical cartridge
- Umax PowerLook 1200 dpi color flatbed scanner w/full Photoshop
- GCC XL 808 Laser Printer, 800x 800 dpi, 11"x17", Ethernet
- Two GCC toner cartridges
- Wacom 12x18 Graphics Tablet Electrostatic
- SuperMicro Extended Services

7100 Systems



7100/66 Valuestation

0 Down! $185 per month

CPU Starting at $2199

$6.08 A Day!

- PowerPC 7100/66MHZ
- Internal CD ROM
- 40MB RAM
- 540MB hard drive
- Extended keyboard
- External SyQuest 88c w/ FREE cartridge
- Sony 17SF Trinitron monitor
- dsc 6000c, 2400x2400 dpi scanner w/ PS LE
- Radius Thunder 24 video card
- TI Pro 600, 600 dpi, 8 ppm printer w/ 2 AppleTalk connectors
- Wacom 6x8 Artz Graphics Tablet
- SuperMicro Extended Services

7100/80 Paperless Office

0 Down! $239 per month

CPU Starting at $2399

$7.85 A Day!

- PowerPC 7100/80MHZ
- Internal CD ROM
- 40mb RAM
- 1.0GB hard drive
- Extended keyboard
- Sony 20SE Trinitron monitor
- Radius Thunder 24 video card
- Globalvillage Teleport Gold fax modem
- Umax UC630 scanner w/ page feeder and OCR software
- Pinnacle Micro CDR-1000 CD-ROM Recorder
- SuperMicro Extended Services

LOW Prices

7100/80 Designstation

0 Down! $264 per month

CPU Starting at $2599

$8.67 A Day!

- PowerPC 7100/80MHZ
- Internal CD ROM
- 72MB RAM
- 1.0GB hard drive
- Extended keyboard
- Turbo SyQuest 200 external w/ 1 FREE cartridge
- Sony 20SE Trinitron monitor
- Radius Thunder 24 video card
- dsc 8000c, 3600x3600 dpi scanner w/ full Photoshop
- TI MicroLaser Pro 600 PS23, 600 dpi, 8 ppm printer w/ 2 AppleTalk connectors
- Wacom 12x12 Graphics Tablet
- SuperMicro Extended Services

6100 Systems



6100/66 Data Entry Workstation

0 Down! $95 per month

CPU Starting at $1499

$3.12 A Day!

- PowerPC 6100/66MHZ
- Internal CD ROM
- 24MB RAM
- 540MB internal hard drive
- Extended keyboard
- Apple 15" Trinitron monitor
- TI MicroLaser Pro 600, 600 dpi, 8 ppm printer w/ 2 AppleTalk connectors
- SuperMicro Extended Services

72 Hour Replacement Guarantee

6100/60 DTP Solution

0 Down! $159 per month

CPU Starting at $1399

$5.22 A Day!

- PowerPC 6100/66MHZ
- Internal CD ROM
- 24MB RAM
- 540MB internal hard drive
- Extended keyboard
- External SyQuest 88c w/ cartridge
- Sony 17SF Trinitron monitor
- Radius 24xk video card
- dsc 6000c, 2400x2400 dpi color flatbed scanner w/Transparency and Photoshop LE
- TI Pro 600 printer w/ 2 AppleTalk connectors
- Wacom 6x8 Artz Graphics Tablet
- SuperMicro Extended Services

LOW Prices

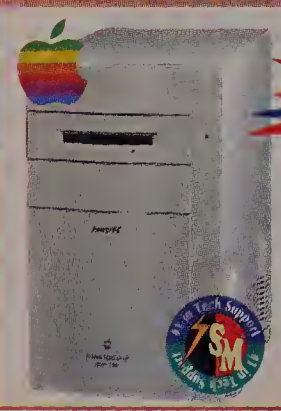
System Specials

Every SuperMicro system is completely assembled and tested before shipping—all ready to run.

Since 1989

CPU/XKey/Mouse	Monitor/Caro	Cash	Lease	
8100/110/16/2.0GB/CD	**None/Thunder 24**	**$5299**	**$121**	$
8100/110/72/2.0GB/CD	Sony 17" /Thunder 24	$8049	$184	
8100/110/136/4.3GB/CD	**Sony 20" /Thunder 24**	**$12,228**	**$280**	$
8100/80AV/72/540/CD	Sony 17" /Thunder 24	$7499	$171	
7100/66/24/1.0GB	Sony 17" /Thunder 24	$4699	$107	
7100/80/40/700/CD	Sony 20" /Thunder 24	$7295	$167	
6100/66/24/540	14" hi-res color monitor	$2575	$58	
6100/60/8/350	**14" hi-res color monitor**	**$1799**	**$44**	$

Monthly Specials



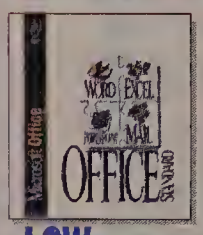
Fully Loaded 8100/110 $5299!

- PowerMac 8100/110 CPU
- 16MB RAM
- 2GB hard drive
- Internal dual-spin CD-ROM
- Radius Thunder 24 series IV video card

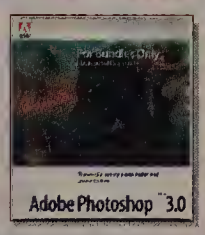
LOW Prices

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While they last!



Purchase $400 or more and get Microsoft Office 3.0 or Adobe Photoshop 3.0.1 for only $299



Scanners

- 24-bit color
- 400 x 800 dpi
- Cold cathode lamp technology



Umax Vista S8 Pro $919!

UMAX

Scanner	Description	Price	
dsc 6000c	600 dpi flatbed w/PS LE	$449	
dsc 8000c	800 dpi flatbed w/PS LE	$549	
dsc 12000C w/trans	**1200 dpi flatbed w/PS LE**	**$949**	SALE
Agfa StudioScan IIsi	400 dpi flatbed	$829	
Agfa Arcus Plus w/trans	1200 dpi flatbed	$2149	
ScanMaker IIHR	600 dpi flatbed	$789	
Umax Vista S8 Pro	**800 dpi flatbed**	**$919**	SALE
ScanMaker 35t	**1800 dpi slide**	**$899**	SALE
Nikon CoolScan	2700 dpi slide	$1369	
Polaroid SprintScan	2700 dpi slide	$1859	
StudioScan II adapter	transparency upgrade	$369	
Microtek adapter	transparency upgrade	$519	

Printers

TI MicroLaser Pro 600 PS23 $1189!

Texas Instruments

- 600 dpi camera ready output
- 8.5" x 11" print size
- 500 sheet capacity

Model	Resolution	Size	Price	
TI MicroLaser Pro 600 PS23	**600x600**	**8.5"x14"**	**$1189**	$
TI MicroLaser Pro E	600x600	8.5"x14"	$1365	
TI MicroLaser PowerPro	600x600	8.5"x14"	$1629	
Primera Pro Color	300x600	8.5"x11"	$1499	
Primera Pictura 310 Color	**300x300**	**12"x18"**	**$3899**	$
Epson StylusColor	300x300	8.5"x11"	$529	
GCC XL 608	600x600	11"x17"	$2189	
GCC XL 808	**800x800**	**11"x17"**	**$2719**	$

Graphics Tablets



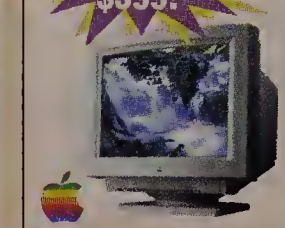
- 1016 lpi resolution
- Pressure-sensitive stylus with no cord or batteries!

Wacom SD-420E 12"x12" tablet $487!

Model	Size	Price	
Wacom ArtZ	6" x 8"	$279	
Wacom SD-420E	**12" x 12"**	**$487**	$
Wacom SD-310E	12" x 18"	$699	
Wacom UD-1825	18" x 25"	$1999	
Calcomp Drawing Slate II	12" x 12"	$249	

Monitors

Apple 15" Color Monitor $399!



- Super Fine Pitch Trinitron Tube
- 15" diagonal screen
- 1280 x 1024 resolution
- .25mm aperture grille pitch
- Flat, anti-glare screen
- Color temperature adjustable from 5000° to 9300°K

LOW Prices

Monitor	Resolution	Price	
Sony 1425	14in, 25mm, 1024x768	$321	
Sony 15SF	15in, 25mm, 1024x768	$439	
Sony 17SF	**17in, 25mm, 1024x768**	**$859**	SALE
Sony 20SE	20in, 25mm, 1280x1024	$1889	
NEC 17XE	17in, 25mm, 1280x1024	$979	
Apple 15	**15in, 25mm, 1024x768**	**$399**	SALE
Apple 17	17in, 1024x768, .26mm	$799	

Video Cards

Radius Thunder 24 $799!

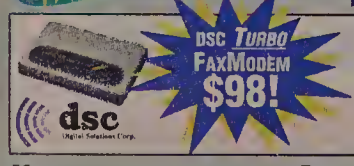
- 24-bit color at 1152 x 870 dpi!
- Photoshop acceleration

rad is

Video Caros	Resolution	Price	
Radius Spectrum 24 Series V	1024x768	$399	
Radius Thunder 24	**1152x870**	**$799**	$
Radius Spectrum Power, 1152	1152x870	$1138	
Radius Thunder II Series IV GX 1152	1152x870	$1819	
Radius Thunder II Series IV GX 1360	1360x1024	$2239	
Radius Thunder II Series IV GX 1600	**1600x1200**	**$2769**	$

LOW Prices

Fax Modems



dsc Turbo FaxModem $98!

- 14,400 bps data transmission rate
- 100% AT&T compatible
- Free fax software included!

Model	Description	Price	
dsc Turbo FaxModem	**External, 14,4K bps**	**$98**	SALE
US Robotics Sportster 28.8 V.34	External, 28.8K bps	$248	
SupraFAXModem 28.8 MC V.34	External, 28.8K bps	$219	
GlobalVillage TelePort Gold II	External, 14,4K bps	$123	
GlobalVillage TelePort Platinum	**External, 28.8K bps**	**$226**	SALE

44MB Cartridges $29!

SyQuest Cartridges

LOW Prices



Cartridges		Price
270MB Cartridges	(5 + or with drive purchase)	$56
200MB Cartridges	(5 + or with drive purchase)	$70
105MB Cartridges	(5 + or with drive purchase)	$50
88MB Cartridges	(5 + or with drive purchase)	$37 /45 SALE
44MB Cartridges	(5 + or with drive purchase)	$29 /39 SALE

Optical Cartridges



3.5" Optical	Price
Sony 128MB	$29
dsc 128MB	$17
Komag 128MB	$24
Verbatim 128MB	**$18** SALE
dsc 230MB	**$25** SALE
Komag 230MB	$28
Sony 230MB	$39

FEATURING SyQuest REMOVABLE TECHNOLOGY

FREE! Sony Video Tape with any 10 Sony Cartridges



5.25" Optical	Price
Sony 600/650MB	$75
DSC 600/650MB	$64
Komag 600/650MB	$69
Ricoh (1024) 650MB	**$59** SALE
Tahiti II 1GB	$159
Komag 1.0GB	$81
dsc 1.2/1.3GB	$79
Maxoptix 1.2/1.3GB	$83
Sony 1.2/1.3GB	**$85** SALE

Tapes

Cartridges	Price
Sony DAT 90m	$12
Sony DAT 120m	**$24** SALE
Maxell 8mm 112m	$21
Sony 6250	$25
Sony 6525	$29

Save on Komag Optical Cartridges!

Get high performance, quality and cost effective storage from the world's leader in storage technology—Komag!

Komag

Komag 1.3GB Cartrioges $83!



5.25"	Price
600/650MB	$69
1.0GB	$81
1.2/1.3GB	**$83** SALE

3.5"	Price
128MB	**$24** SALE
230MB	$28



- Compatible with all magneto optical drives
- Made in the USA
- Every cartridge fully tested and certified
- LIFETIME Warranty

Hard Drives

NEW!

dsc

FWB Hard Disk Toolkit. $59 Value!



dsc Turbo Drives

Now even faster! Turbo models have guaranteed 72-hour replacement *plus* FWB Hard Disk Toolkit—***FREE!***

72 Hour Replacement Guarantee

Turbo Seagate Elite 3 $1299!

Quantum

Quantum Warranty: 2 to 5 Years

Model	Access	Internal	External	dsc Turbo	
85MB Go	Daytona	17ms	$179	$309	$324
256MB Go	Daytona	17ms	$199	$319	$344
341MB Go	Daytona	17ms	$289	$409	$434
512MB Go	Daytona	17ms	$374	$454	$479
42MB	Maverick	17ms	$79	$139	$164
85MB	**Maverick**	**17ms**	**$110**	**$170**	**$195** SALE
270MB	Maverick	14ms	$140	$200	$225
365MB	Lightning	11ms	$145	$205	$230
540MB	Maverick	14ms	$185	$245	$270
540MB	Lightning	11ms	$195	$255	$280
730MB	Lightning	11ms	$215	$275	$300
1.0GB	Fireball	9.5ms	$345	$405	$430
1.4GB	Empire	9.5ms	$659	$719	$744
2.1GB	**Atlas**	**9.5ms**	**$849**	**$909**	**$934** SALE
4.2GB	Atlas	9.5ms	$1145	$1205	$1230

Seagate

Seagate Warranty: 5 Years

Model	Access	Internal	External	dsc Turbo	
1.0GB	Hawk 1	9ms	$519	$579	$629
2.1GB	Hawk 2LP	9ms	$839	$899	$924
2.1GB	Barracuda 2LP	8ms	$1029	$1089	$1114
2.1GB	Barracuda 2W*	8ms	$1129	$1189	$1239
4.3GB	**Hawk 4LP**	**9ms**	**$1329**	**$1389**	**$1439** SALE
4.3GB	Barracuda 4LP	8ms	$1479	$1539	$1589
4.3GB	Barracuda 4W*	8ms	$1579	$1639	$1689
3.4GB	**Elite 3**	**10ms**	**$1189**	**$1249**	**$1299** SALE
9.1GB	Elite 9	11ms	$2589	$2689	$2739

IBM

IBM Warranty: 5 Years

Access	Internal	External	dsc Turbo	
12ms	$140	$200	$225	
12ms	$169	$229	$254	
12ms	$199	$259	$284	
11ms	**$225**	**$285**	**$310**	SALE
11ms	$499	$559	$584	
11ms	N/A	$799	$824	

LOW Prices

Fujitsu

Fujitsu Warranty: 5 Years

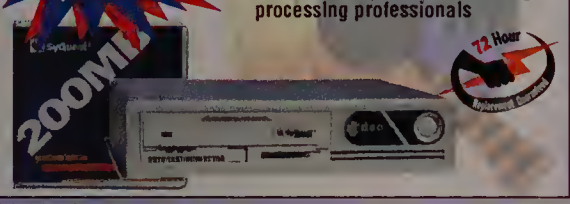
Access	Internal	External	dsc Turbo	
9ms	**$199**	**$259**	**$284**	SALE
9ms	$509	$569	$594	
9ms	$889	$949	$974	

For Active Termination, add $29. Additional 50/50 SCSI cables, $15 each.

Includes external drive, 25/50 SCSI Cable, MAC SW and terminator. Turbo models include FWB Hard Disk ToolKit, active terminator and 72-hour warranty repair.

** Fast/Wide drives require ATTO SE IV SCSI interface card at $895*

SyQuest 200MB $345!



- High speed—15ms access time!
- 5.25" format
- Compatible with SyQuest 44, 88 and 200MB cartridges
- Meets the requirements of Image processing professionals

72 Hour Replacement Guarantee

SyQuest Drives

dsc Turbo-charged SyQuest Drives!

Model	Internal	External	dsc Turbo	
SyQuest 270	**$360**	**$400**	**$425**	SALE
SyQuest 200	**$345**	**$385**	**$410**	SALE
SyQuest 105	$150	$190	$215	
SyQuest 88C	$250	$290	$315	
SyQuest 44	$125	$155	$180	

Includes external drive, 25/50 SCSI Cable, MAC SW and terminator. Turbo model includes FWB Hard Disk ToolKit and 72-hour warranty repair.

Sony SDT-5000 $939!

Tape Drives



- Built in data compression
- 16GB per 120 meter tape
- Low cost, dependable backup

FREE! 72 hour Replacement Guarantee with any tape drive purchase!

Model	Capacity	Size	MacKit	dsc Turbo	
Sony SDT-2000	2GB	3.5"HH	$725	$775	
Sony SDT-4000	8GB	3.5"HH	$889	$939	
Sony SDT-5000	**5-16GB**	**3.5"HH**	**$939**	**$989**	SALE
Exabyte 8200	2GB	5.25"FH	$1199	$1249	
Exabyte 8500	5GB	5.25"FH	$1899	$1949	
Exabyte 8205	**2-5GB**	**5.25"HH**	**$1479**	**$1529**	SALE
Exabyte 8505XL	5-10GB	5.25"HH	$2189	$2239	

Includes external drive, 25/50 SCSI Cable, MAC SW and terminator. Turbo model includes Retrospect and 72-hour warranty repair.

Multifunctional Drives

SyQuest 200 /540MB HD Combo $669!

- Up to 6 devices in the same enclosure!
- Costs less than individual drives
- Quick setup. Only one cable!
- Promotes data security. Just lock it away after hours.

Multifunctional	Price	
SyQuest 200 /540MB hard drive	**$669**	SALE
Sony SDT 5000 /2.0GB Quantum	$1899	
Sony 650MB Optical /SyQuest 200	$1199	
Olympus 3.5" optical /Nikon Coolscan	$1899	
SyQuest 88c /650MB optical drive	**$1099**	SALE
SyQuest 88c /NEC 3X CD ROM /540MB HD	$979	
Archive 525 Tape drive /540MB harddrive	$699	
NEC 3X CD-ROM /1.3GB optical drive	$1799	
4.0GB Quantum HD /Nikon CoolScan	$2679	

Includes external drive, 25/50 SCSI Cable, terminator, Mac SW and 72-hour warranty repair.

Optical Drives

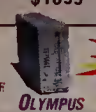
Sony 1.3GB $1699!



- High 2.0MB p/s transfer rate
- Economical storage of large color images and digital audio/video data

5.25" Drives	Capacity	Seek	MacKit	dsc Turbo	
Sony 650	650MB	19ms	$999	$1049	
IBM 650	**650MB**	**27ms**	**$699**	**$749**	SALE
Ricoh 650EX	650MB	25ms	$899	$949	
MaxOptix-Tahiti I	650MB/1.3GB	27ms	$799	$849	
MaxOptix-Tahiti II	1.0GB	25ms	1299	$1349	
MaxOptix-Tahiti III	1.3GB	25ms	$1989	$2039	
Ricoh 1.3GB Turbo	1.3GB	24ms	$1599	$1649	
Sony 1.3GB	**1.3GB**	**25ms**	**$1699**	**$1749**	SALE

FREE! Global Village Teleport Bronze with every optical drive! $129 Value!



Olympus 128 $389!

3.5" Drives	Capacity	Seek	MacKit	dsc Turbo	
Olympus 128	**128MB**	**35ms**	**$389**	**$439**	SALE
Panasonic 128	128MB	35ms	$399	$449	
Fujitsu-230	230MB	30ms	$569	$594	

Includes external drive, 25/50 SCSI Cable, MAC SW and terminator. Turbo model includes FWB Hard Disk ToolKit and 72-hour warranty repair.

DSC Quad Speed $299!

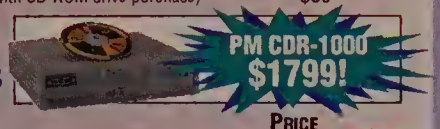
CD-ROM Drives



- Quad speed
- Supports PhotoCD, Multisession and MPC
- Includes FWB CD ToolKit FREE!

Model	Price	
DSC Quad Speed	**$299**	SALE
Toshiba 3501 QuadSpeed	$375	
Apple 300e Plus	**$299**	SALE
NEC MultiSpin 4Xe	$459	
CD-ROM Special (with CD-ROM drive purchase)	$59	

CD ROM Recorders



PM CDR-1000 $1799!

Model	Price	
PinnacleMicro CDR-1000	**$1799**	SALE
Yamaha 4-Speed CD-ROM Recorder	$3369	

Disk Arrays

dsc 4.0GB Array $2569!



- Supports Raid Levels 0 and 1 for disk mirroring and striping
- Speeds up all applications—including VideoVision Studio!

72 Hour Replacement Guarantee

Model	Description	Array	VideoVision	
dsc 2.0GB Array	(2 x 1.0GB drives)	$1319	N/A	
dsc 4.0GB Array	**(2 x 2.0GB drives)**	**$2569**	**$2899***	SALE
dsc 8.0GB Array	**(2 x 4.0GB drives)**	**$2999**	**$3699***	SALE
dsc CD-ROM Array	**(6 x Quadspeed)**	**$1299**	**N/A**	

Includes external disk array, SCSI Cable, MAC SW and terminator.
**VideoVision Studio support requires ATTO Fast/Wide interface; add $895*

800-352-3413

OPEN EVERY DAY: WEEKDAYS 6:00AM TO 8:00PM, WEEKENDS 8:00AM TO 4:00PM.

SuperMicro $100,000 Lease Credit

SuperMicro

Image Processing Specialists

385 Van Ness Ave. #110
Torrance, CA 90501

310-782-5760 International
310-782-5974 Fax



Circle 126 on reader service card

Mac Systems & Peripherals

Guaranteed Low Prices • Immense Inventory • Custom Config. Specialists • Volume Discounts • Knowledgable Staff • Live Operater • Experienced in Video, Sound, Desk Top Publishing & Networking • Corporate, Dealer, End User, Int'l, Education, Consultent, Goverment Departments

ABOVE COST

Leasing Advantages

Take advantage of possible Tax Savings while Saving Capitol for Profitable Ventures. • increase your Cash Flow • Fixed Payments with $0 Down and an Option to Purchase • Upgrade at anytime • increase Productivety and avoid Obsolescence with Warrantied Equipment for entire lease term.

*Ask our Lease Dept. for details on a Lease to fit your business needs.



Lease $73 per mo

Small Business Station

PowerMac 7100/80, 8-700 w/CD
15" Multiscan Display
Extended Design Keyboard
Sale Price.....$2625



Lease $117 per mo

CyberMac 81 Workstation

PowerMac 8100/100AV, 16-1000 CD
17in Multiscan Display
Extended Design Keyboard
Sale Price.....$4189

Demon Workstation 8110



PowerMac 8100/110, 16-2000 CD
Supermac 21T•XL, 1600x1200 Color Display
Thunder IV/GX 1600
VideoVision 2 Pro Pak w/4.2 GB Array
Premiere 4 & VideoFusion
Ext KB, Apple Design Speakers
Sale Price.....$17,999

Lease $426* per mo

PCI PowerMacs

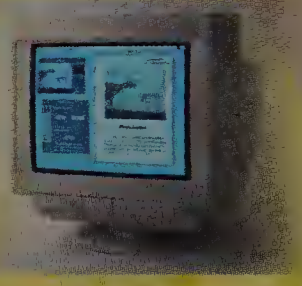
9500, 120 MHz w/4x CD	4249	
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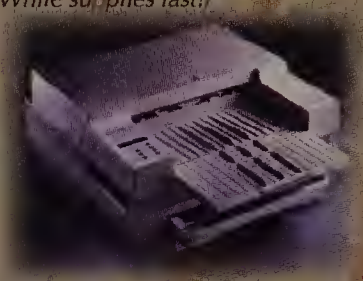
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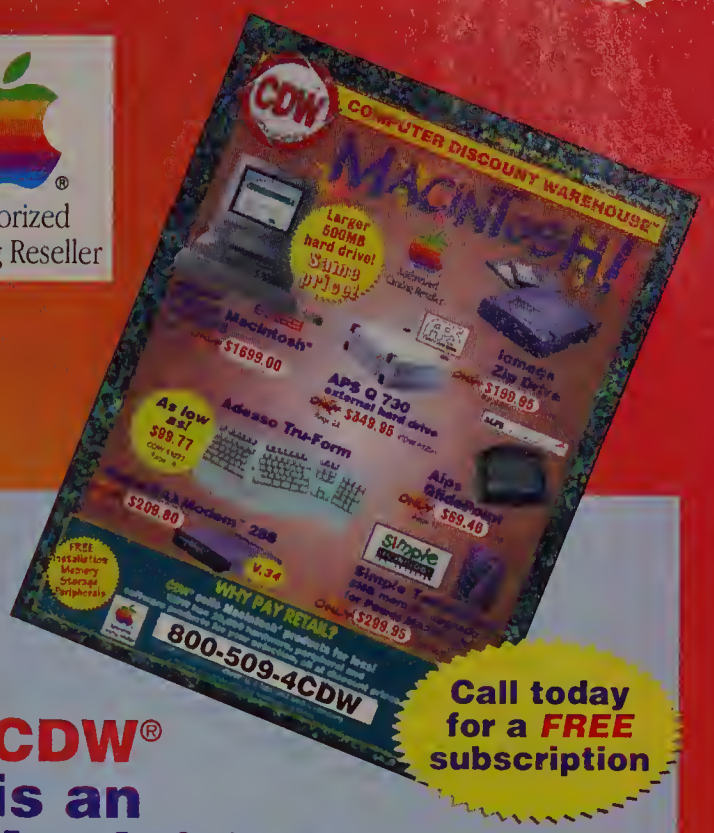
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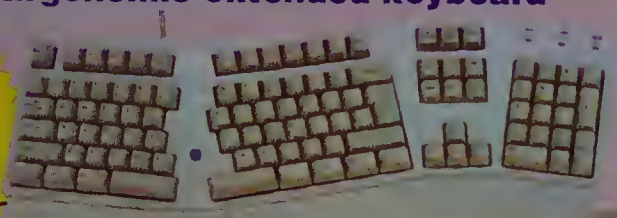
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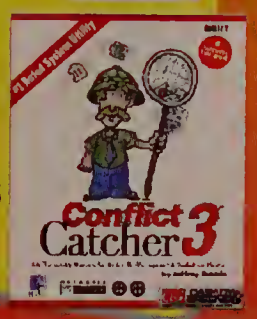
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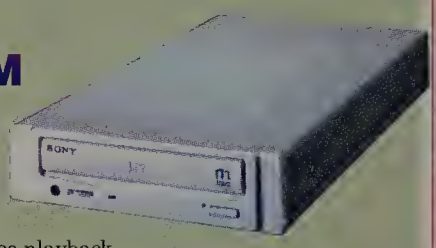
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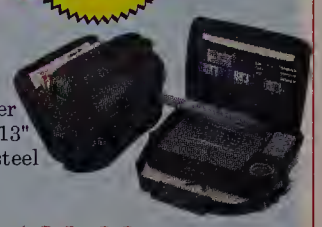
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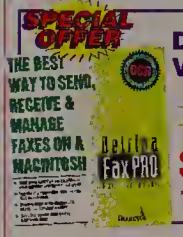
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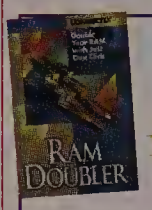
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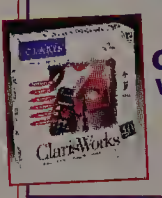
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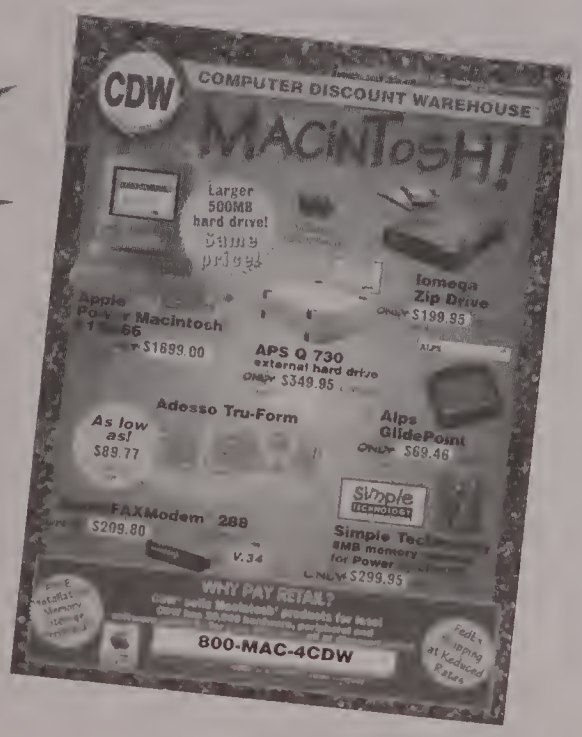
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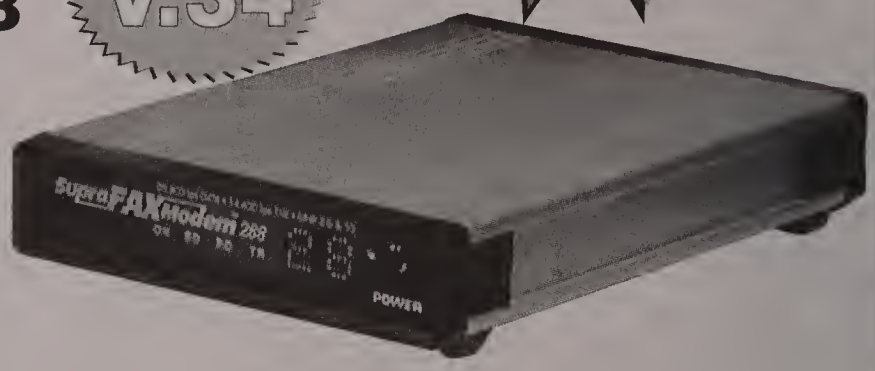
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Conner	2147MB	9ms	5400	512K	5yr	CFP2105S	$879	$939
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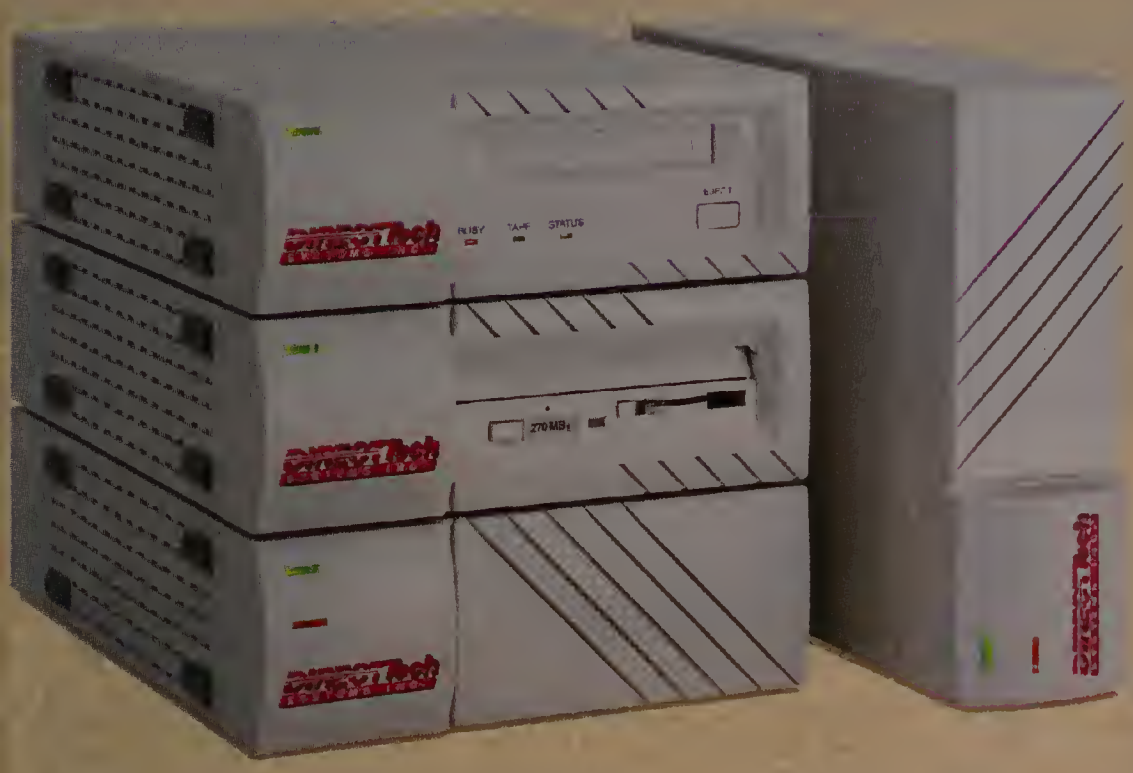
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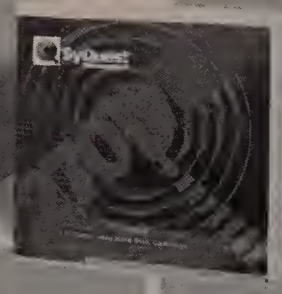
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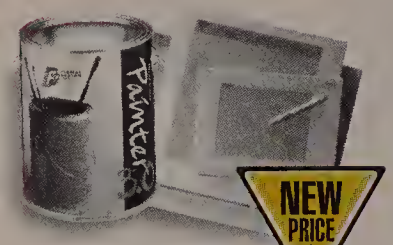
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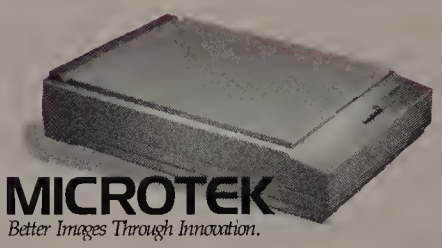
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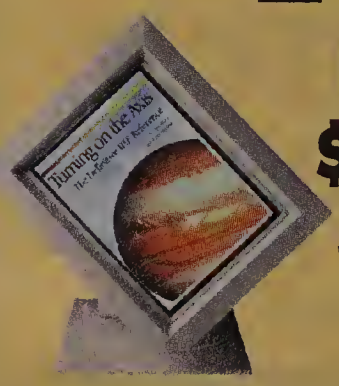
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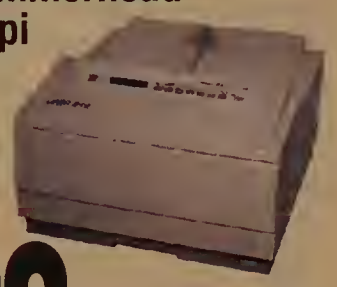
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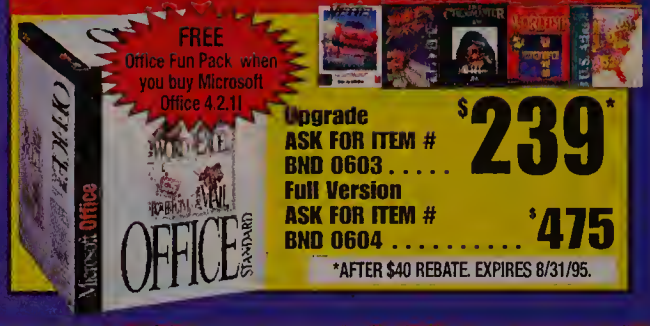
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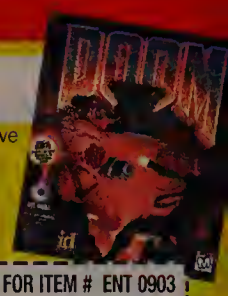
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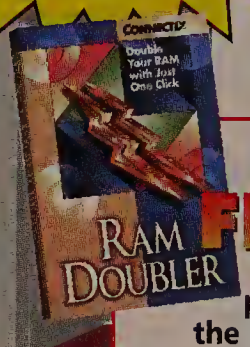
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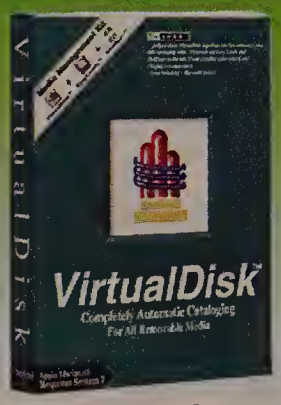


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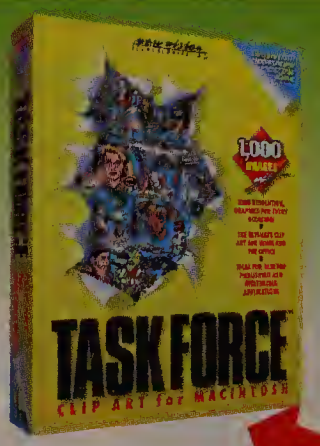
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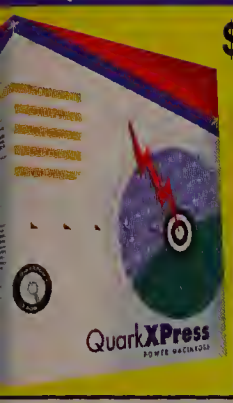
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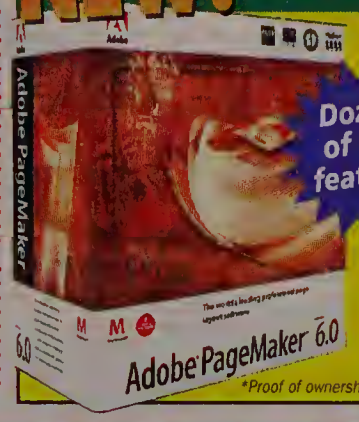
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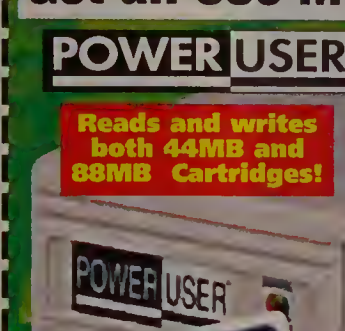
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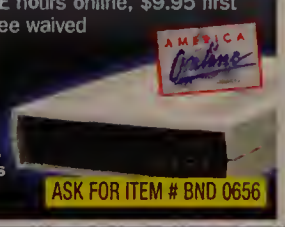
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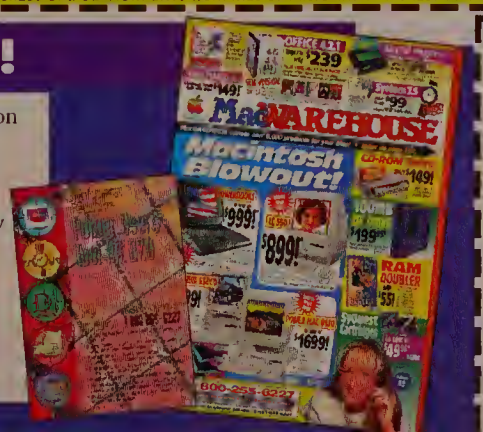
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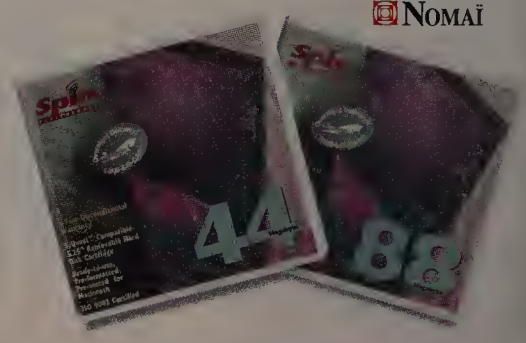
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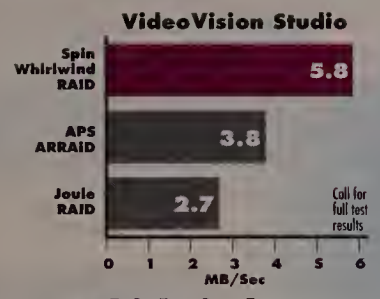
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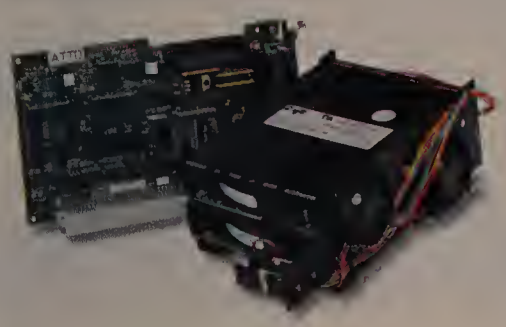


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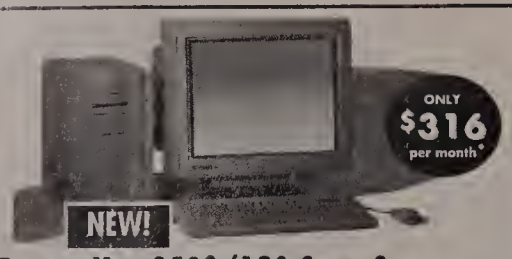
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Trailblazer	420 MB	14MS	128k	3 Years	4500	3.5	185	265
Maverick	540 MB	14MS	128k	2 Years	3600	3.5	195	275
Fireball	545 MB	12MS	128k	3 Years	5400	3.5	205	285
Lightning	541 MB	11MS	128k	2 Years	4500	3.5	204	284
Lightning	730 MB	11MS	128k	2 Years	4500	3.5	255	335
Trailblazer	**850 MB**	**14MS**	**128k**	**3 Years**	**4500**	**3.5**	**269**	**349**
Fireball	1080 MB	12MS	128k	3 Years	5400	3.5	435	515
Atlas	1075 MB	8MS	1024k	5 Years	7200	3.5	775	855
Atlas	2150 MB	8MS	1024k	5 Years	7200	3.5	985	1065
Capella	2216 MB	8.5MS	512k	5 Years	5400	3.5	839	919
Grand Prix	4300 MB	8.6MS	512k	5 Years	7200	3.5	1149	1229
Atlas	4300 MB	8 MS	1024k	5 Years	7200	3.5	1449	1529

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2221 A/V	2050 MB	8.9MS	512k	5 Years	7200	3.5	999	1079
2221	2050 MB	8.9MS	512k	5 Years	7200	3.5	999	1079
2221 A/V	2050 MB	8.9MS	512k	5 Years	7200	3.5	999	1079
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2243 WIDE	4294 MB	8.9MS	512k	5 Years	7200	3.5	1459	1539
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9991 WIDE	9091 MB	12 MS	512k	5 Years	5400	5.25	2299	2399

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ST31230N	1050 MB	9MS	512k	5 Years	5400	3.5	519	599
ST31230W	1050 MB	9MS	512k	5 Years	5400	3.5	649	729
ST32550N	2147 MB	8MS	512k	5 Years	7200	3.5	989	1069
ST32550W	2147 MB	8MS	512k	5 Years	7200	3.5	1159	1239
ST15150N	4294 MB	8MS	1024k	5 Years	7200	3.5	1479	1559
ST15150W	4294 MB	8MS	1024k	5 Years	7200	5.25	1590	1660
ST410800N	9090 MB	11MS	1024k	5 Years	5400	5.25	2349	2429
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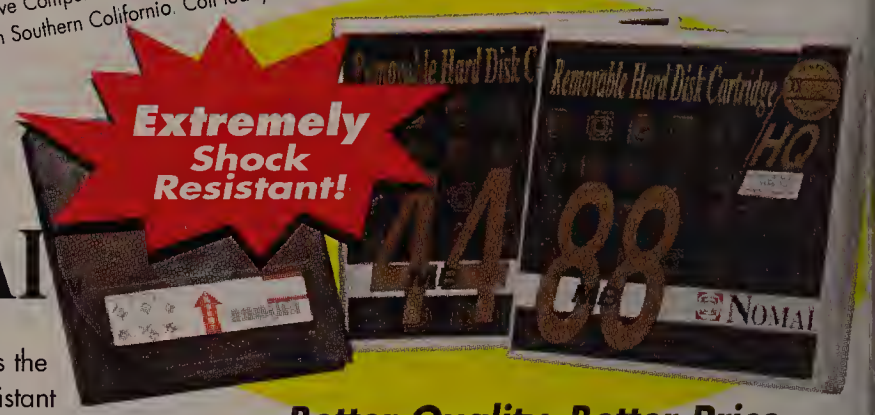
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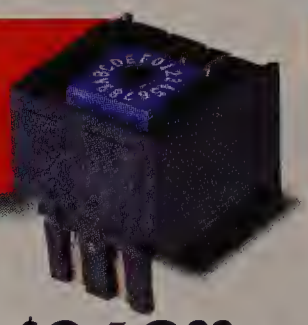


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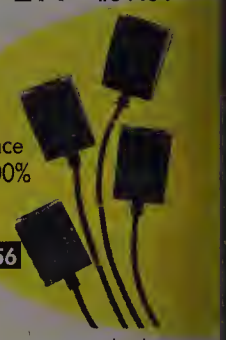
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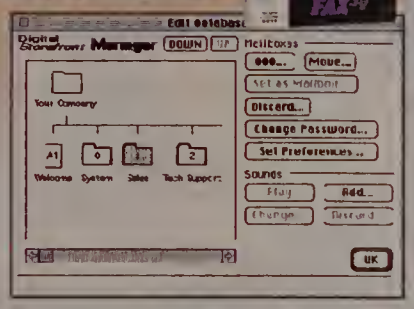
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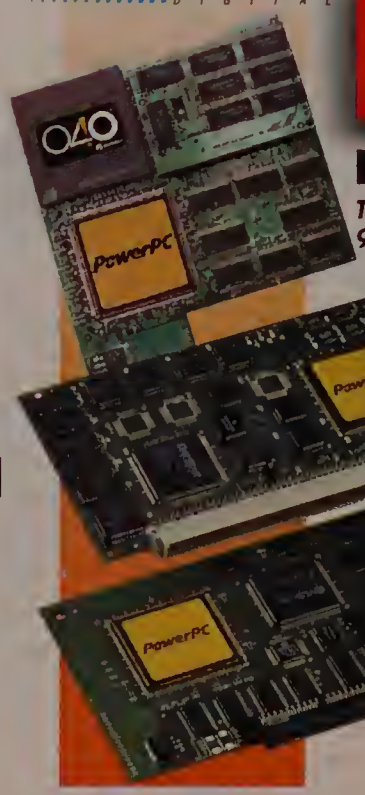
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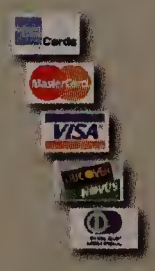
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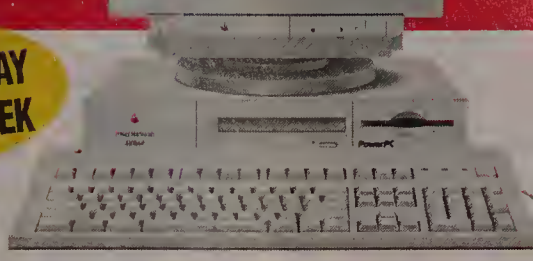
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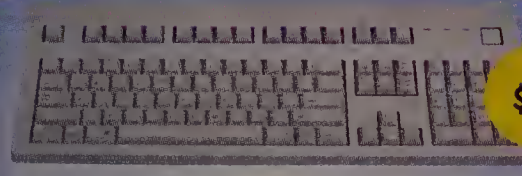
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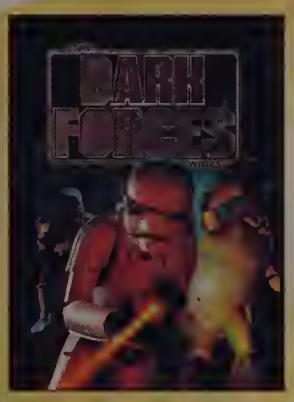
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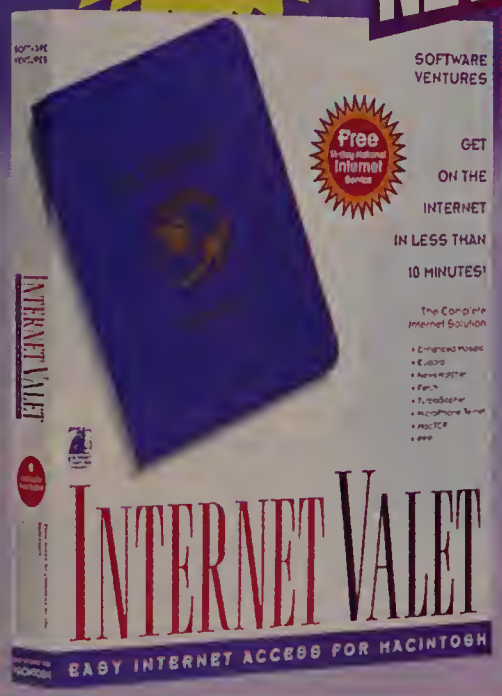
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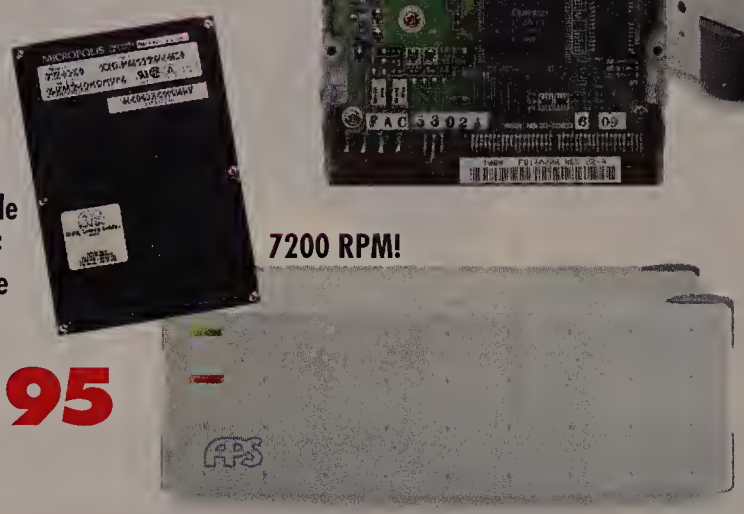
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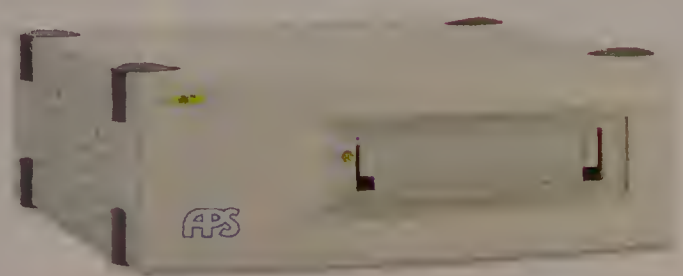


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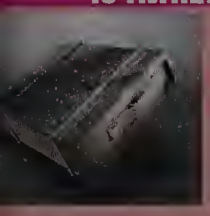
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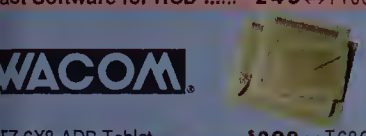
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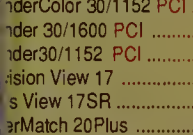
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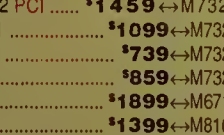


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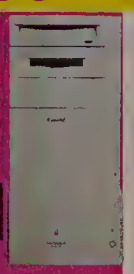


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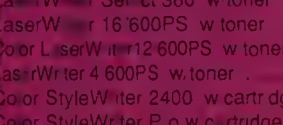


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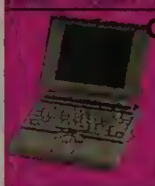
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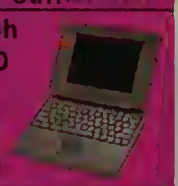
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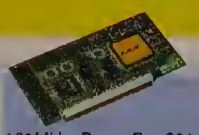
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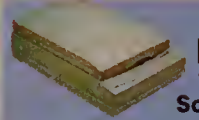
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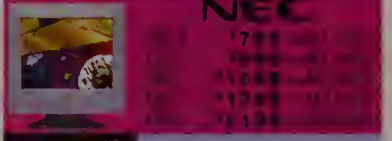


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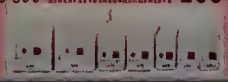


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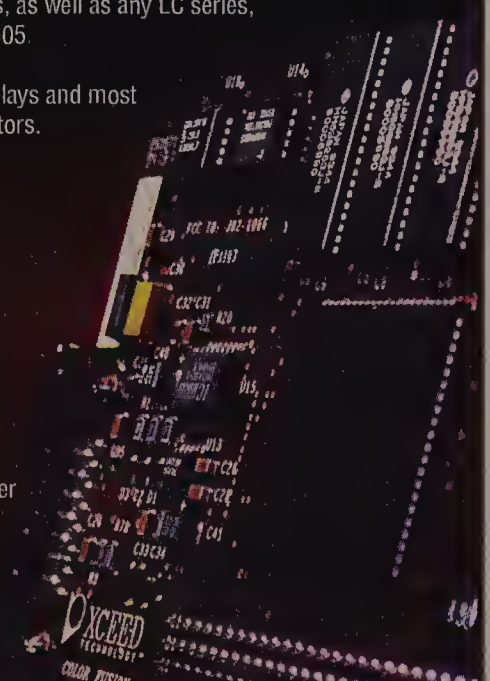
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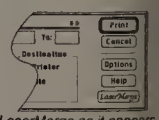
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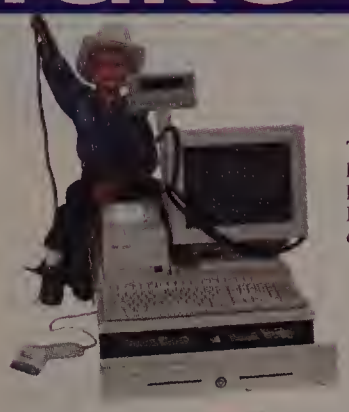
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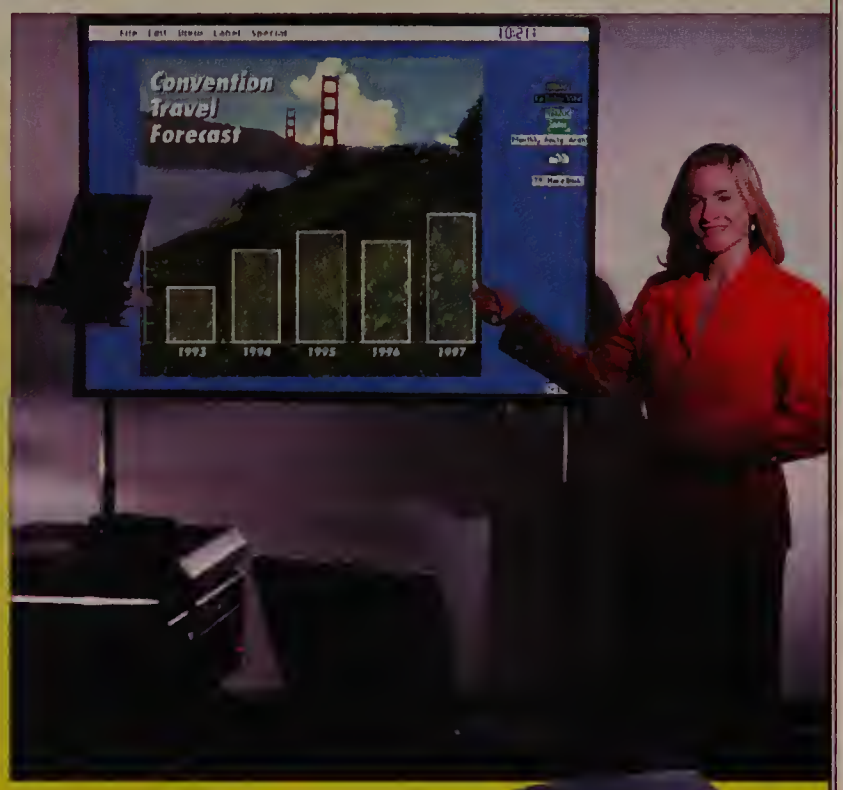
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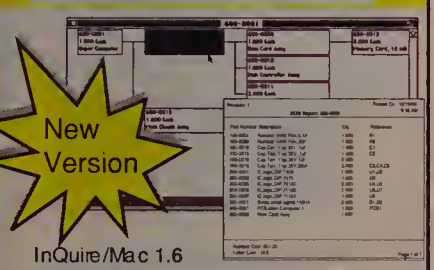
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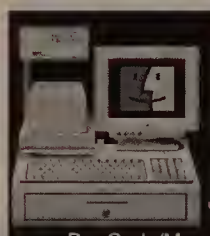
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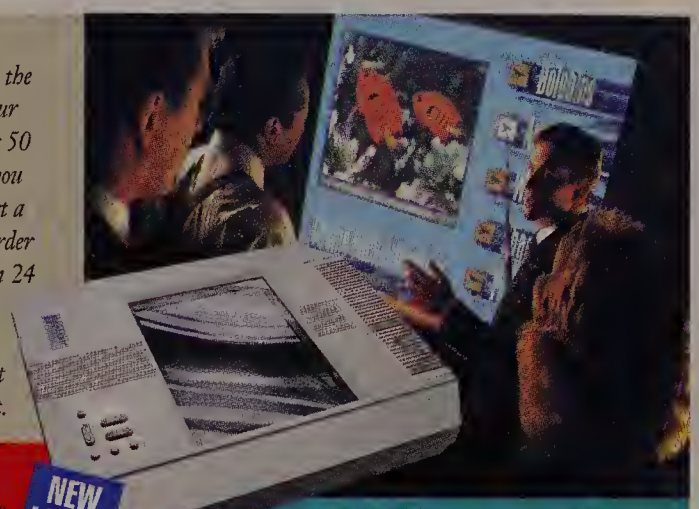
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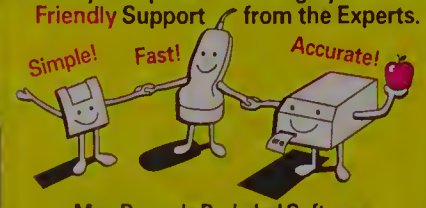
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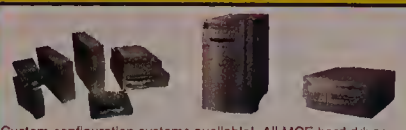
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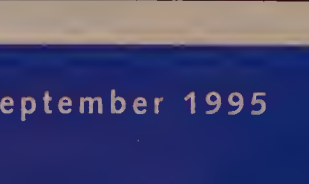
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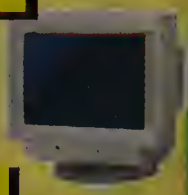
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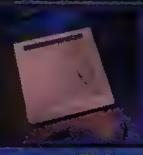
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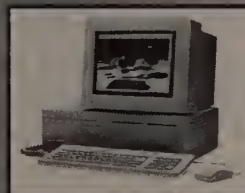
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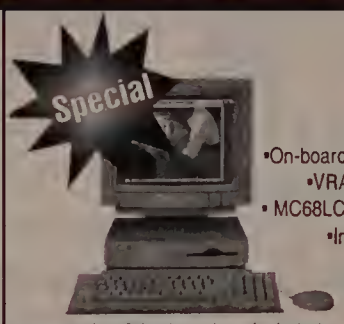
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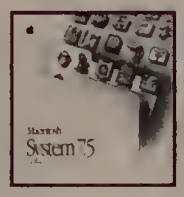
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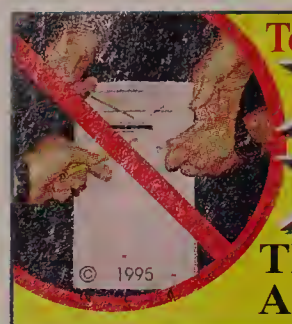
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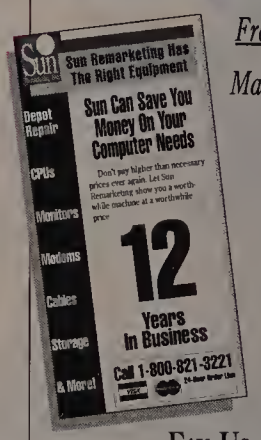
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Q/Ctrs 650 to 7100/80*	$1299
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520C 12-320-Modem	2689
520 4-320/4-160	1769/1569
280C	Call

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180 8-160	Call
170 4-160	1085
160 8-80	1085
Duo 230 4-80	899
Duo 250/270/270C	Call

Call us for PB 's notlisted

Demo Macs

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PM 7100 66	Call
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Preforma 550	625
Quadr 950	1899
Quadra 900	1499
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Syq 200 - 20" Monitor Tri.
Ext Keyboard Mouse Pad
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Parts

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7100/80AV	16/700/CD	3339
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8100/100	136/2GIG/CD	7995
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520C	12/320/FAX	2799
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540C	12/320/FAX	3499
540C	12/500/FAX	3899
DUO 280	4/240	2199
DUO 280	12/240/FAX	2699
DUO 280C	4/320	2949
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PRINTERS

StyleWriter II	199
StyleWriter 2400	399
StyleWriter 2400 PRO	439
Epson Stylus	529
Apple LaserWriter Select 360	1099
Apple LaserWriter 16/600	1799
Apple LaserWriter Pro 810	2695

MONITORS

Apple 14"/15"	289/399
Apple 17"/20"	929/1899
Sony 15SF/17SF	469/859
Sony 17SE1/20SE1	1049/1899
SuperMac PressView 21T	2949
SuperMac 17	799
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SuperMac 20PLUS	1429
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Radius Intelli Color 20E 20"	1899
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CIRCLE 467 ON READER SERVICE CARD

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8100/100 48/1G/cd	Call
8100/110 16/2G/cd	Call

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Port. Col Stylwrter	**Call**
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520C 4/160	Call
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Duo Dock 230HD	599
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Epson Scan 1200C	1295
Epson Stylus color	545
APC 450va UPS	175

Agfa

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N.E.C.

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XV 17	775
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15" Multiple Scan	445.
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Sony

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Internal

365MB SCSI	153.
730MB SCSI	**235.**
1080MB SCSI	523.
2.1GB SCSI	864.

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630	4/250	1250
578	8/320.CD	1650
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Apple 20" Multiple Scan	1849
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Apple 15" Multiple Scan	449
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Apple Printers

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Color Style Writer 220	395
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LaserWriter Select 360	1150
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Thunder IVGX 1152	1820
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Precision Color 17	989
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ScanJet IICX	830
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8100/100	2700	3095	3695	4460	5995	7995
8100/100AV	3100	3295	3895	4660	6195	8195
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TO / From	8100/110AV	7100/80
800/840	$1920	$1490
650/950	2095	1530
900/610	2750	1795

Parts

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7100/80 Logic Board	1595
Quad.800/840 L.Board	1195/1595
Quad. 950/650 L.Board	1495
Generic Mouse	29
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Soft Window	100
Apple CD 300e Plus	217
Apple Ext. Keyboard II	119
Apple Std. Keyboard	69
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PowerBook 500 Battery	120
GEO Port.	130
System 7.5 on CD	25
External Case f/CD300i+	25

Demo Mac's

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8100/100	16/700CD	2895
Quadra 840AV	8/230	2199
Quadra 800	8/230	1795
Quadra 950	0/0	1999
Quadra 650	8/230	1595
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radius

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Precision View 17 ..... $889↔M73254
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SuperMatch 20Plus ..... $1459↔M81060
Intellicolor Display 20e ..... $1889↔M13609
SuperMatch 21TXL ..... $2079↔M96067
Press View 21T ..... $2959↔M96118
2 page 20GS ..... $829↔M39408
Precision Color 24XP ..... $279↔V19488
SpectrumSeries V 24 Bit ..... $399↔V16110
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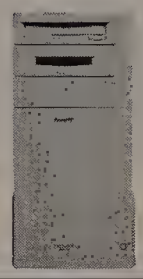
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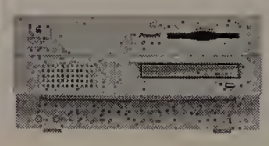
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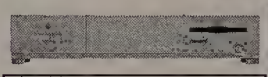
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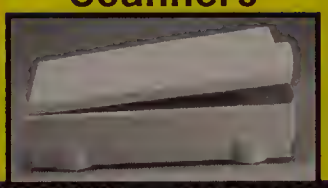
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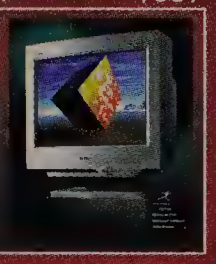
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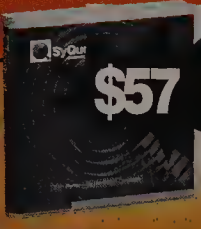
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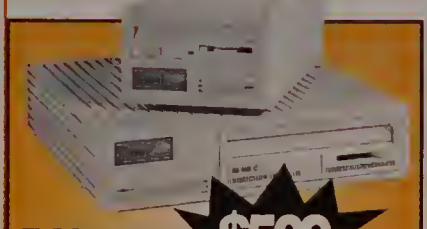
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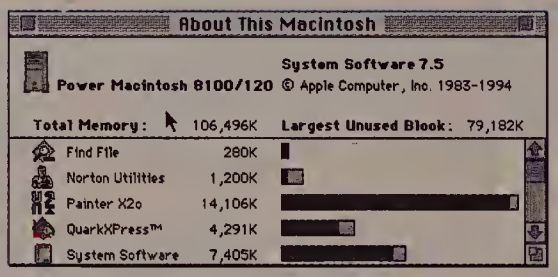
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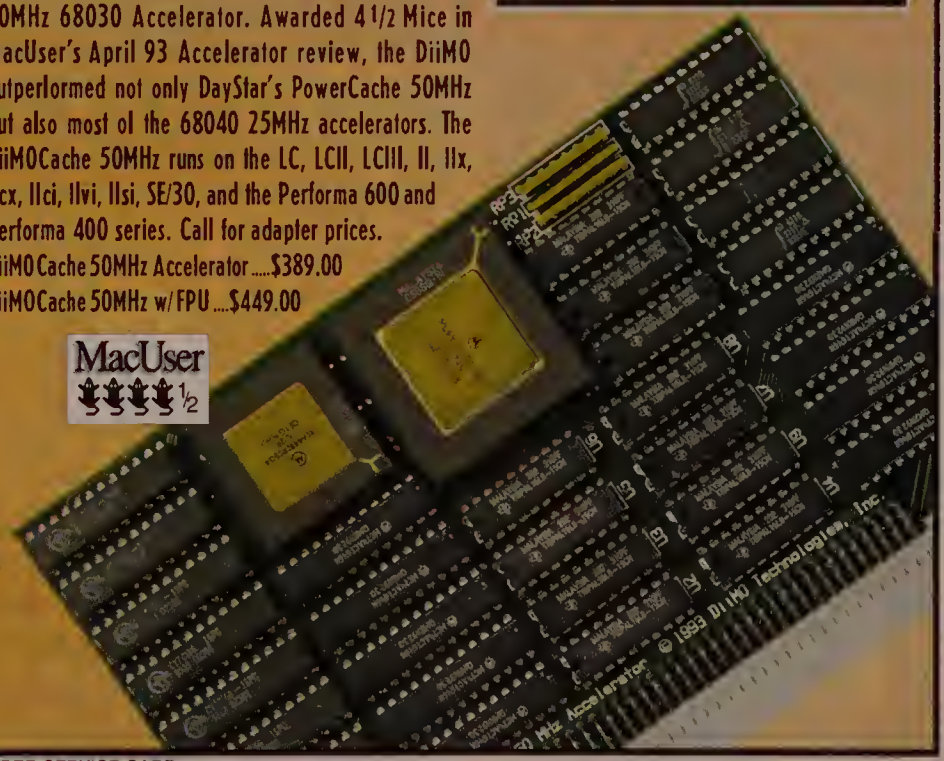
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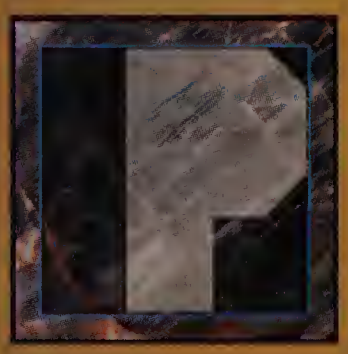
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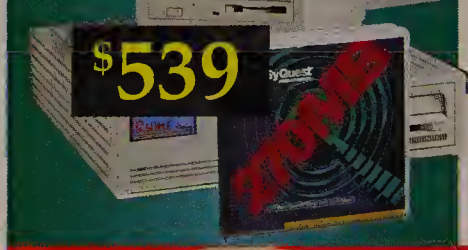
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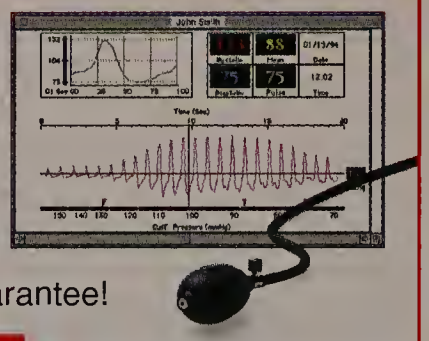
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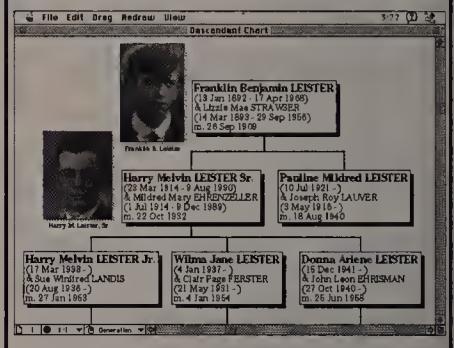
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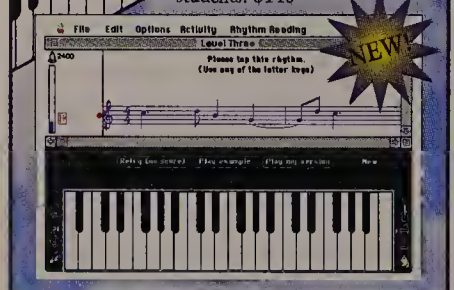
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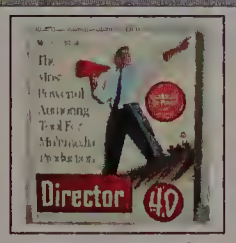
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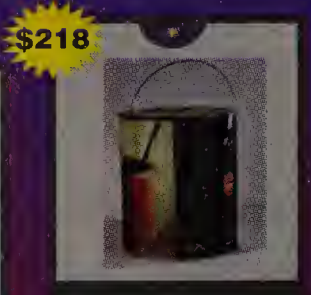
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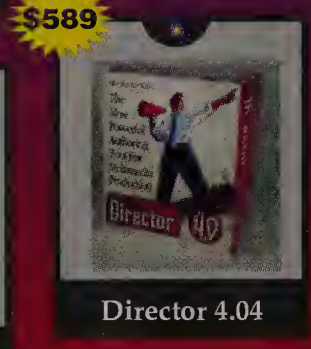














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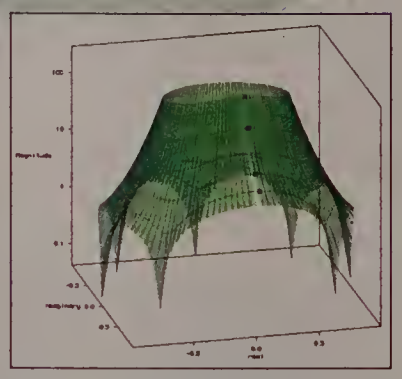
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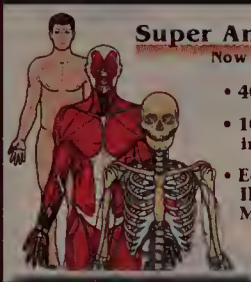
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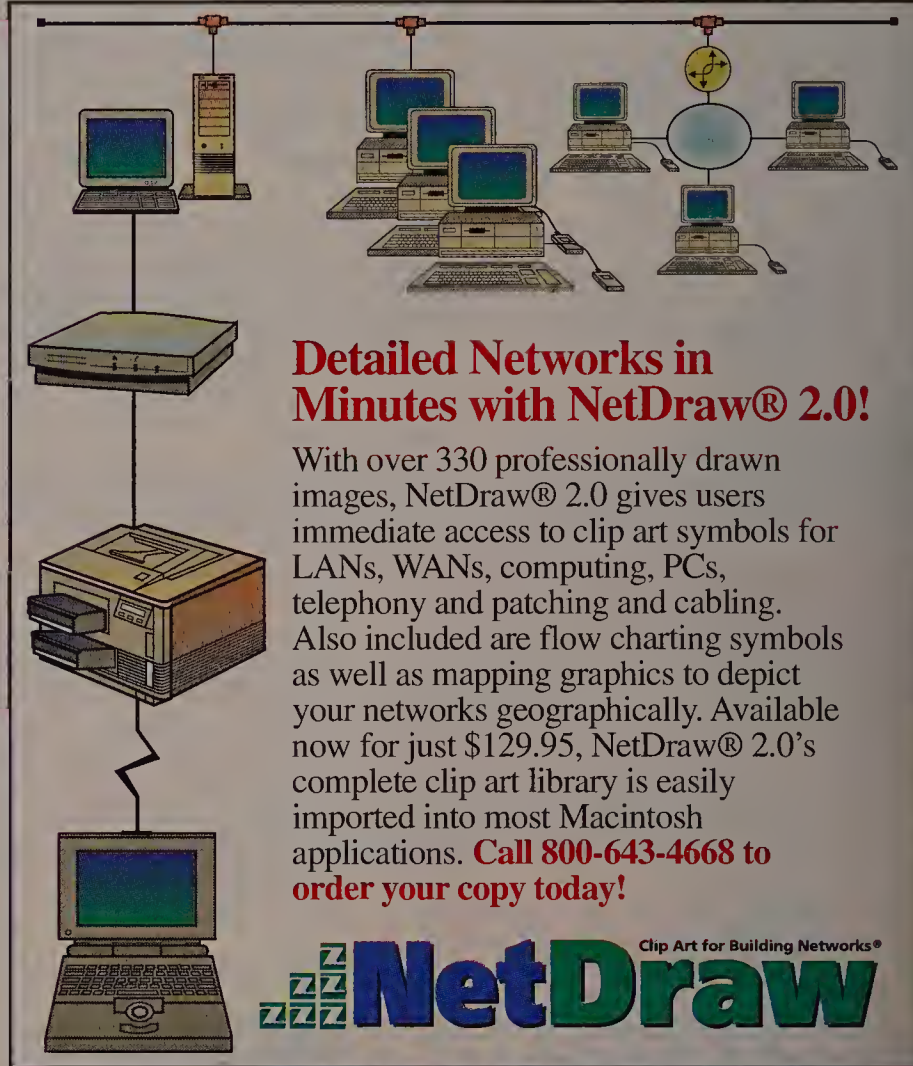
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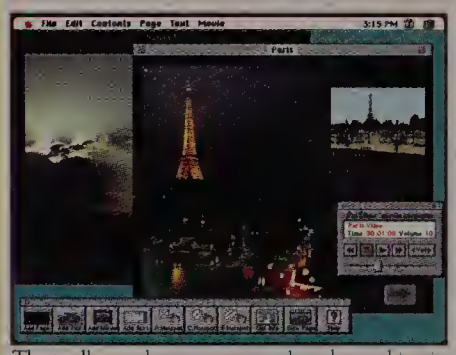
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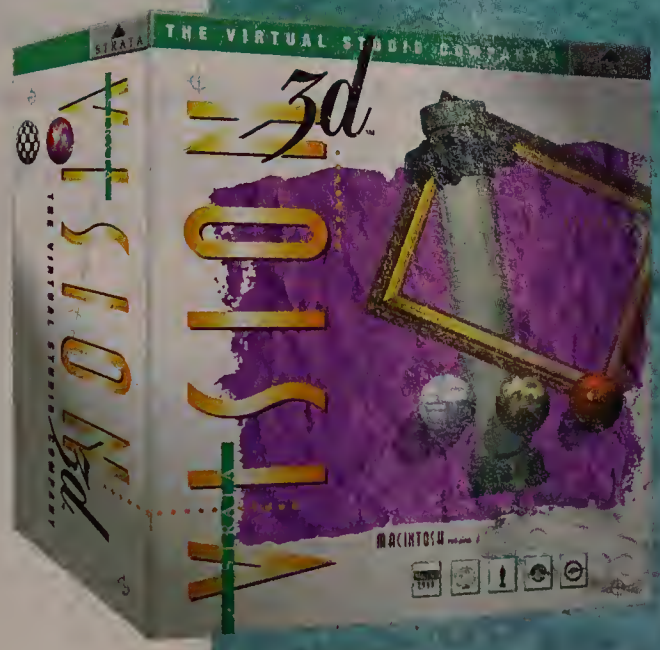
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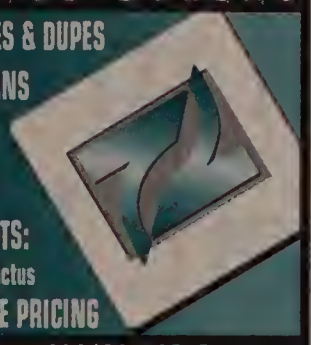
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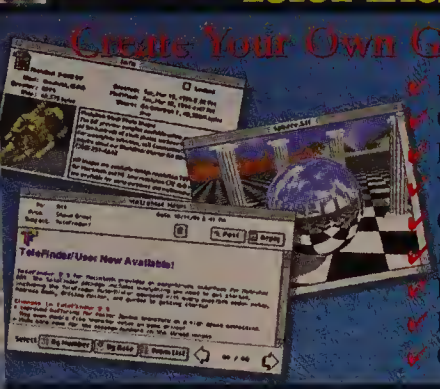
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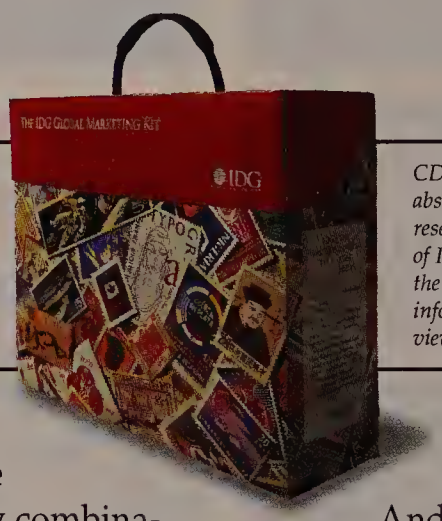


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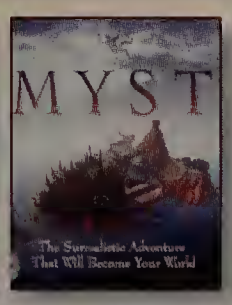
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Mac Battle

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TWO COLUMNS AGO I EXpressed my belief that the people using lawsuits to compete with Microsoft were wimps. Little did I know this column would create great interest among *Macworld* readers in competitive tactics—not only in the specific case of competing with Microsoft, but also in driving any enemy crazy. For this reason, I now provide the top ten ways to drive your competition crazy.

Just Say Know

Method 1: Know your customer. Complete knowledge of your customers is the first step to pleasing them. And your customers' satisfaction drives the competition wild. Being willing to listen to the customer is 80 percent of the battle, and creating mechanisms to make communication easy is the other 20 percent. Exercise: Does anyone at your company read the comments on warranty and registration cards?

Method 2: Put your customer's interests before your own. The single best way to drive your competition crazy is to do the right things for the customer—things that are not specifically aimed at your competition. Exercise: Call your voice-jail system. Send your company an E-mail or fax. Are you pleasing your customer or trying to keep personnel costs down?

Method 3: Create a cause, not just a product. A cause is a way of doing things that catalyzes loyalty. A product is a collection of disks, manuals, slipcases, and shrink-wrap. One of the few Macintosh markets Microsoft has not been able to dominate is databases. This is because 4th Dimension is a cause, not just a product. Causes transform customers into evangelists, and evangelists are unpaid salespeople.

Just Say No

Method 4: Concentrate on stuff that matters and ignore the rest. Business is remarkably simple. You have to create a good product, ship it, and support your customers. Yet many companies get obsessed with superfluous, newfangled multimedia technology. Exercise: Compare how much you're spending on a Web page to how much you're spending on technical support.

Method 5: Resist the known and defend the unknown. When Apple was creating Macintosh, the experts told the company to "buy Compaq or become another Compaq" to be successful. Apple did exactly the opposite and invented a new kind of interface (or at least copied a new kind of interface). It resisted the known ("build an MS-DOS clone or better Apple IIe") and embraced the unknown: a cute, graphics toy with icons, pull-down menus, and no software.

(To my revisionist way of thinking, Microsoft copied Apple's copy before it was truly known that this interface was the way to go. Thus, when Microsoft copied the Macintosh interface, it was resisting the known and defending the unknown.)



JAMES YANG

Carpe Diem

Method 6: Seize the day. If word processing companies just shortened their product's boot time when an unreasonably high number of fonts—say four—are loaded, they could drive Microsoft crazy. A printing routine that doesn't require repaginating an entire document twice to print a single page would be neat, too. I'd love to get off Word, but I need paragraph-oriented style sheets, footnotes, endnotes, outlining, and table-of-contents generation. Go ahead: seize me.

Method 7: Draw inside, outside, around, and through the lines. In a previous life, before I wrote for *Macworld*, I sent out a letter (with a ballot form) to the registered owners of my company's product asking them to vote for my company's product for *Macworld*'s World-Class Award. The Microsoft PR department went nuts. I didn't break any rules because I wasn't falsifying ballots—I simply redrew the lines. Also, it's not my fault Microsoft didn't think of doing this first. [Sorry, Guy. You get full marks for a highly creative strategy, but we have to lower your score on the success portion of the program. We thought something fishy was going on when all those copies started coming in, and in the interest of fairness we decided to count only ballots that had originally been bound into the magazine.—Your editor]

Method 8: Suck up to a librarian. A librarian armed with Dialog, Lexis-Nexis, and an Internet browser can uncover more facts about your market, customer, and competition than you can imagine. It's also pretty inexpensive and easy to become your own research librarian with a Macintosh, a modem, and some software.

Method 9: Convert competition to coopertition. It's often possible to stop competing and start working together for mutual benefit. Apple and IBM, for example, seem to be working cooperatively to defeat Microsoft. This relationship yields an important additional lesson, though: Make sure you get married because you love each other, not because you hate someone in common.

Method 10: Play with their minds. Dan Eilers, the guy who now runs half of Apple, was once the CEO and president of Claris. While at Claris, he cut a great deal on ClarisWorks with the school district in the Bellevue, Washington, area. Why? So that the kids of Microsoft's employees would tell their parents they were using ClarisWorks at school. I love it. **m**

GUY KAWASAKI is the author of *How to Drive Your Competition Crazy* (Hyperion, 1995). His views are his own and only sporadically represent those of *Macworld*. He has investments in America Online, Apple, Bit Jugglers, BookMaker, Global Village Communication, and Intuit. He is the president of Fog City Software, the creator of Claris Emailer. He can be reached at **kawasaki@radiomail.com**.

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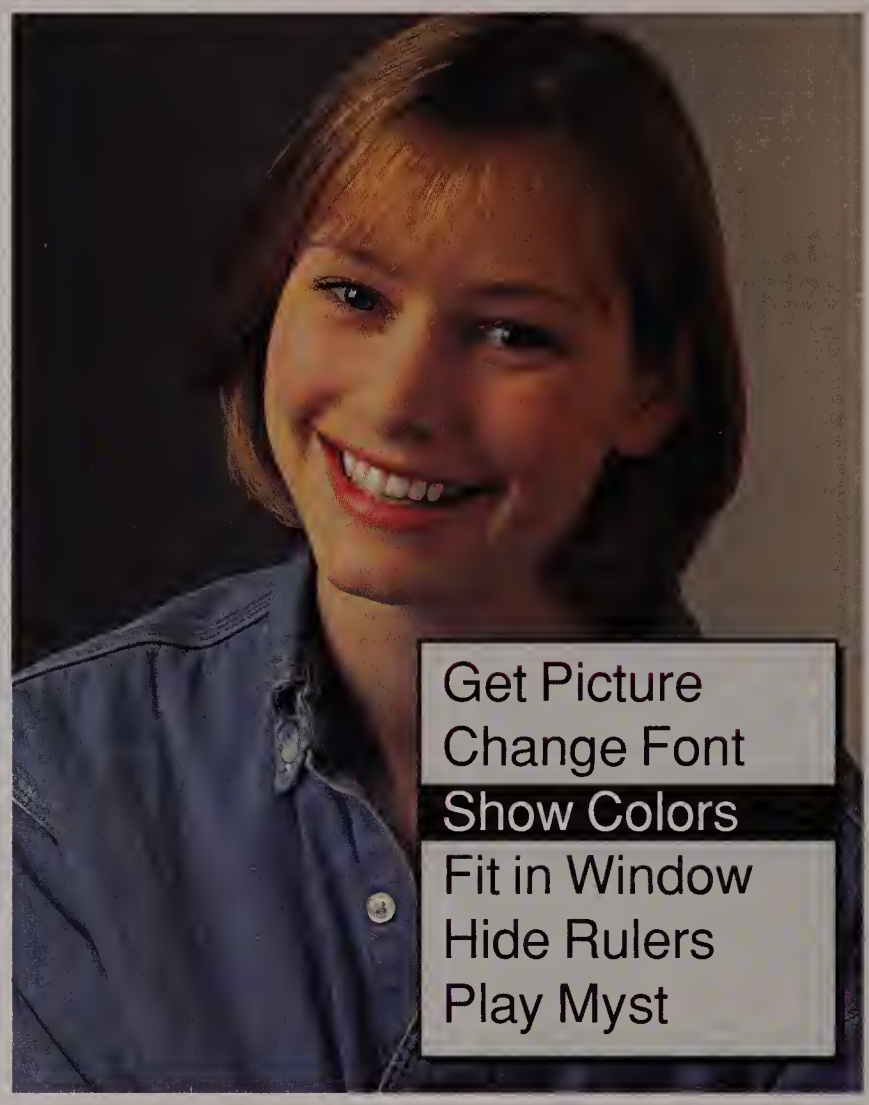
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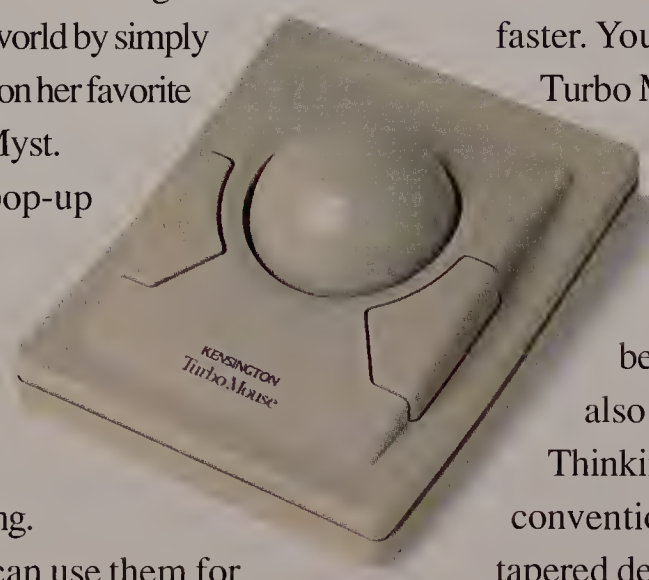
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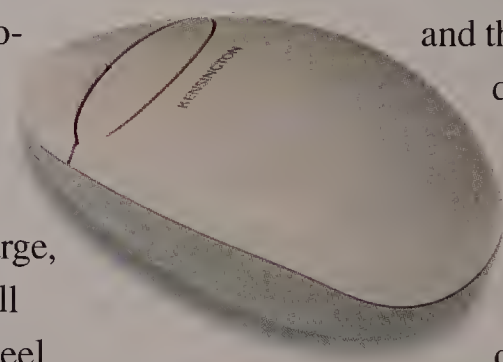
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